wwPDB EM Validation Summary Report

Nov 6, 2023 – 06:40 am GMT

PDB ID	:	7ODT
EMDB ID	:	EMD-12847
Title	:	State C of the human mitoribosomal large subunit assembly intermediate
Authors	:	Lenarcic, T.; Jaskolowski, M.; Leibundgut, M.; Scaiola, A.; Schoenhut, T.; Saurer, M.; Lee, R.G.; Rackham, O.; Filipovska, A.; Ban, N.
Deposited on	:	2021-04-30
Resolution	:	3.10 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

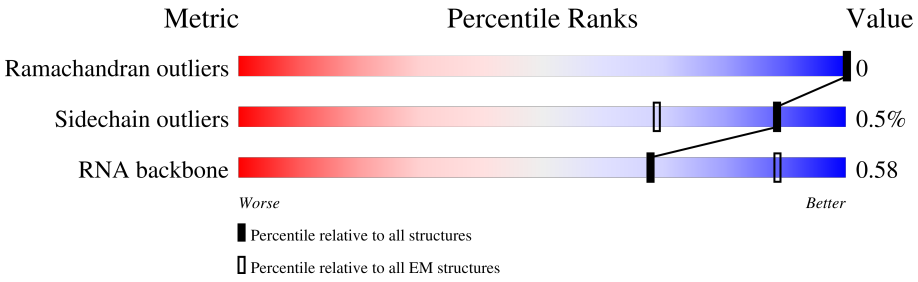
EMDB validation analysis	:	0.0.1.dev70
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.10 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	t	406	38% 76% · 22%
2	u	234	8% 47% 53%
3	v	70	81% 97% ··
4	w	156	50% 51% 49%
5	x	384	10% 89% · 10%
6	y	381	29% 63% · 36%
7	0	188	· 58% · 41%
8	1	65	5% 85% 15%

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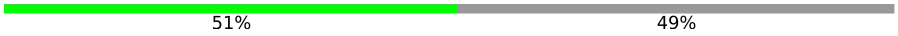
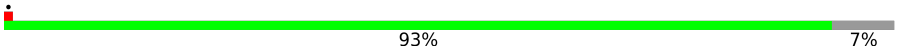
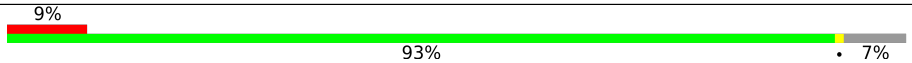
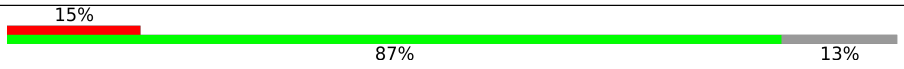
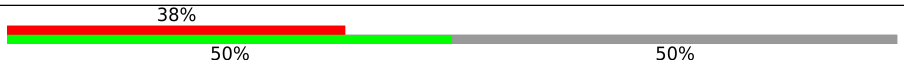
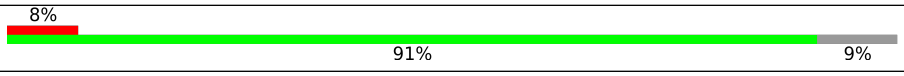
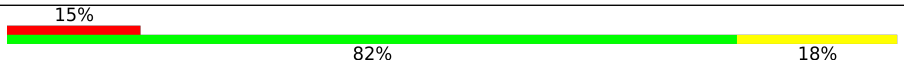
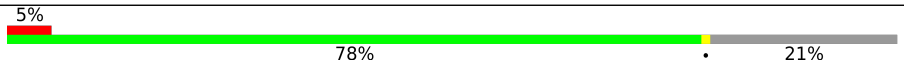
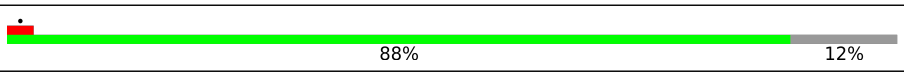
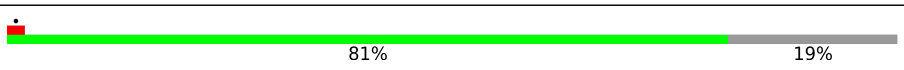
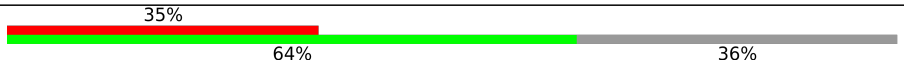
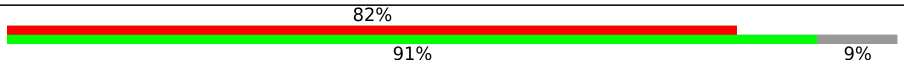
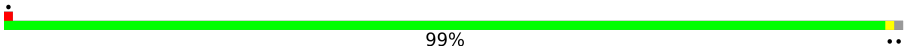
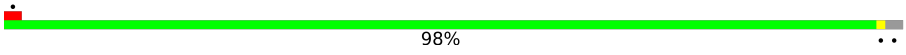
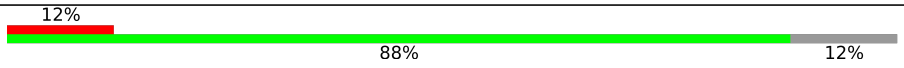
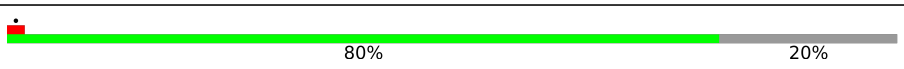
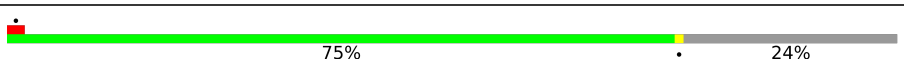
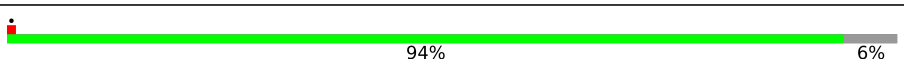
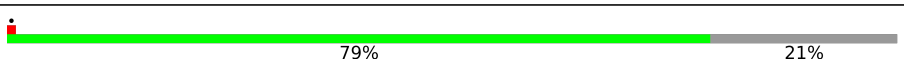
Mol	Chain	Length	Quality of chain
9	2	92	
10	3	188	
11	4	103	
12	5	423	
13	6	380	
14	7	338	
15	8	206	
16	9	137	
17	A	1559	
18	B	72	
19	D	305	
20	E	348	
21	F	311	
22	H	267	
23	I	261	
24	J	192	
25	K	178	
26	L	145	
27	M	296	
28	N	251	
29	O	175	
30	P	180	
31	Q	292	
32	R	149	
33	S	205	

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Mol	Chain	Length	Quality of chain
34	T	206	81% 19%
35	U	153	20% 99%
36	V	216	36% 94% 5%
37	W	148	72% 28%
38	X	256	5% 95% 5%
39	Y	250	72% 28%
40	Z	161	76% 24%
41	a	142	11% 70% 30%
42	b	215	69% 31%
43	c	332	6% 86% 14%
44	d	306	47% 84% 15%
45	e	279	75% 82% 18%
46	f	212	49% 71% 29%
47	g	166	81% 19%
48	h	158	26% 70% 30%
49	i	128	76% 24%
50	j	123	7% 76% 24%
51	k	112	51% 89% 10%
52	l	138	44% 59% 41%
53	m	128	40% 39% 60%
54	o	102	92% 8%
55	p	206	17% 71% 29%
56	q	222	10% 64% 36%
57	r	196	9% 83% 17%
58	s	439	88% 12%

2 Entry composition (i)

There are 65 unique types of molecules in this entry. The entry contains 110473 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Mitochondrial ribosome-associated GTPase 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	t	316	2398	1509	440	441	8	0	0

- Molecule 2 is a protein called Mitochondrial assembly of ribosomal large subunit protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	u	110	919	591	154	164	10	0	0

- Molecule 3 is a protein called MIEF1 upstream open reading frame protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	v	69	588	372	116	100	0	0

- Molecule 4 is a protein called Acyl carrier protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	w	79	638	410	95	128	5	0	0

- Molecule 5 is a protein called 5-methylcytosine rRNA methyltransferase NSUN4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	x	346	2750	1753	482	498	17	0	0

- Molecule 6 is a protein called Transcription termination factor 4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	y	244	1980	1264	342	362	12	0	0

- Molecule 7 is a protein called 39S ribosomal protein L32, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	0	110	Total	C	N	O	S	0	0
			898	554	176	162	6		

- Molecule 8 is a protein called 39S ribosomal protein L33, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	1	55	Total	C	N	O	S	0	0
			455	290	87	76	2		

- Molecule 9 is a protein called 39S ribosomal protein L34, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	2	46	Total	C	N	O	S	0	0
			377	233	83	60	1		

- Molecule 10 is a protein called 39S ribosomal protein L35, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	3	95	Total	C	N	O	S	0	0
			832	539	162	128	3		

- Molecule 11 is a protein called 39S ribosomal protein L36, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	4	38	Total	C	N	O	S	0	0
			342	217	72	49	4		

- Molecule 12 is a protein called 39S ribosomal protein L37, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	5	394	Total	C	N	O	S	0	0
			3210	2073	560	566	11		

- Molecule 13 is a protein called 39S ribosomal protein L38, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	6	354	Total	C	N	O	S	0	0
			2948	1881	525	533	9		

- Molecule 14 is a protein called 39S ribosomal protein L39, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	7	294	Total	C	N	O	S	0	0
			2390	1529	405	438	18		

- Molecule 15 is a protein called 39S ribosomal protein L40, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	8	102	Total	C	N	O	S	0	0
			860	543	152	163	2		

- Molecule 16 is a protein called 39S ribosomal protein L41, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	9	124	Total	C	N	O	S	0	0
			997	644	170	181	2		

- Molecule 17 is a RNA chain called 16S mitochondrial rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	A	1453	Total	C	N	O	P	0	0
			30850	13846	5571	9980	1453		

- Molecule 18 is a RNA chain called mitochondrial tRNAVal.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	B	72	Total	C	N	O	P	0	0
			1522	683	269	498	72		

- Molecule 19 is a protein called 39S ribosomal protein L2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	D	240	Total	C	N	O	S	0	0
			1872	1165	378	320	9		

- Molecule 20 is a protein called 39S ribosomal protein L3, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	E	305	Total	C	N	O	S	0	0
			2406	1545	418	432	11		

- Molecule 21 is a protein called 39S ribosomal protein L4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	F	252	Total	C	N	O	S	0	0
			2031	1305	370	350	6		

- Molecule 22 is a protein called 39S ribosomal protein L9, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	H	97	Total	C	N	O	0	0
			802	508	155	139		

- Molecule 23 is a protein called 39S ribosomal protein L10, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	I	168	Total	C	N	O	S	0	0
			1358	875	246	227	10		

- Molecule 24 is a protein called 39S ribosomal protein L11, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	J	175	Total	C	N	O	S	0	0
			1330	847	237	244	2		

- Molecule 25 is a protein called 39S ribosomal protein L13, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	K	177	Total	C	N	O	S	0	0
			1455	936	259	253	7		

- Molecule 26 is a protein called 39S ribosomal protein L14, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	L	115	Total	C	N	O	S	0	0
			890	559	171	155	5		

- Molecule 27 is a protein called 39S ribosomal protein L15, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	M	291	Total	C	N	O	S	0	0
			2327	1483	430	408	6		

- Molecule 28 is a protein called 39S ribosomal protein L16, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	N	222	Total	C	N	O	S	0	0
			1786	1143	326	307	10		

- Molecule 29 is a protein called 39S ribosomal protein L17, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	O	154	Total	C	N	O	S	0	0
			1259	792	241	219	7		

- Molecule 30 is a protein called 39S ribosomal protein L18, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	P	144	Total	C	N	O	S	0	0
			1173	733	224	211	5		

- Molecule 31 is a protein called 39S ribosomal protein L19, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Q	221	Total	C	N	O	S	0	0
			1843	1179	327	328	9		

- Molecule 32 is a protein called 39S ribosomal protein L20, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	R	140	Total	C	N	O	S	0	0
			1154	732	231	187	4		

- Molecule 33 is a protein called 39S ribosomal protein L21, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	S	161	Total	C	N	O	S	0	0
			1293	835	227	227	4		

- Molecule 34 is a protein called 39S ribosomal protein L22, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	T	166	Total	C	N	O	S	0	0
			1369	875	254	233	7		

- Molecule 35 is a protein called 39S ribosomal protein L23, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	U	152	Total	C	N	O	S	0	0
			1251	788	234	226	3		

- Molecule 36 is a protein called 39S ribosomal protein L24, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	V	205	Total	C	N	O	S	0	0
			1676	1068	298	302	8		

- Molecule 37 is a protein called 39S ribosomal protein L27, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	W	106	Total	C	N	O	S	0	0
			835	536	157	139	3		

- Molecule 38 is a protein called 39S ribosomal protein L28, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	X	244	Total	C	N	O	S	0	0
			2044	1322	352	365	5		

- Molecule 39 is a protein called 39S ribosomal protein L47, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	Y	181	Total	C	N	O	S	0	0
			1556	995	298	259	4		

- Molecule 40 is a protein called 39S ribosomal protein L30, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	Z	122	Total	C	N	O	S	0	0
			996	636	186	171	3		

- Molecule 41 is a protein called 39S ribosomal protein L42, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	a	100	Total	C	N	O	S	0	0
			840	529	152	154	5		

- Molecule 42 is a protein called 39S ribosomal protein L43, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	b	149	Total	C	N	O	S	0	0
			1189	739	230	217	3		

- Molecule 43 is a protein called 39S ribosomal protein L44, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	c	286	Total	C	N	O	S	0	0
			2299	1470	397	423	9		

- Molecule 44 is a protein called 39S ribosomal protein L45, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	d	259	Total	C	N	O	S	0	0
			2124	1357	369	384	14		

- Molecule 45 is a protein called 39S ribosomal protein L46, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	e	228	Total	C	N	O	S	0	0
			1848	1174	326	342	6		

- Molecule 46 is a protein called 39S ribosomal protein L48, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	f	150	Total	C	N	O	S	0	0
			1196	764	197	231	4		

- Molecule 47 is a protein called 39S ribosomal protein L49, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	g	134	Total	C	N	O	S	0	0
			1113	719	193	199	2		

- Molecule 48 is a protein called 39S ribosomal protein L50, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	h	110	Total	C	N	O	S	0	0
			895	568	156	168	3		

- Molecule 49 is a protein called 39S ribosomal protein L51, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	i	97	Total 828	C 532	N 165	O 127	S 4	0	0

- Molecule 50 is a protein called 39S ribosomal protein L52, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	j	94	Total 745	C 463	N 144	O 136	S 2	0	0

- Molecule 51 is a protein called 39S ribosomal protein L53, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	k	101	Total 774	C 479	N 148	O 142	S 5	0	0

- Molecule 52 is a protein called 39S ribosomal protein L54, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	l	82	Total 688	C 437	N 120	O 128	S 3	0	0

- Molecule 53 is a protein called 39S ribosomal protein L55, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	m	51	Total 419	C 262	N 82	O 73	S 2	0	0

- Molecule 54 is a protein called Ribosomal protein 63, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	o	94	Total 798	C 501	N 165	O 129	S 3	0	0

- Molecule 55 is a protein called Peptidyl-tRNA hydrolase ICT1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	p	147	Total 1205	C 748	N 228	O 225	S 4	0	0

- Molecule 56 is a protein called Growth arrest and DNA damage-inducible proteins-interacting protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	q	141	Total	C	N	O	S	0	0
			1177	732	229	211	5		

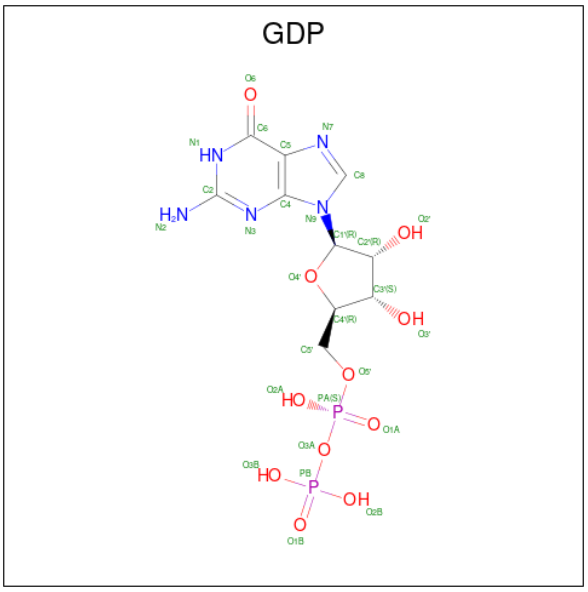
- Molecule 57 is a protein called 39S ribosomal protein S18a, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	r	162	Total	C	N	O	S	0	0
			1322	839	252	223	8		

- Molecule 58 is a protein called 39S ribosomal protein S30, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	s	386	Total	C	N	O	S	0	0
			3155	2023	559	559	14		

- Molecule 59 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).



Mol	Chain	Residues	Atoms					AltConf
59	t	1	Total	C	N	O	P	0
			28	10	5	11	2	

- Molecule 60 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
60	t	1	Total	Mg	0
			1	1	

Continued on next page...

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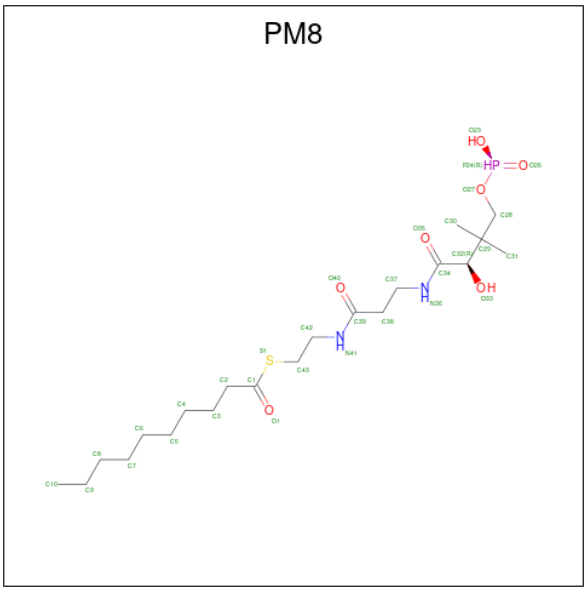
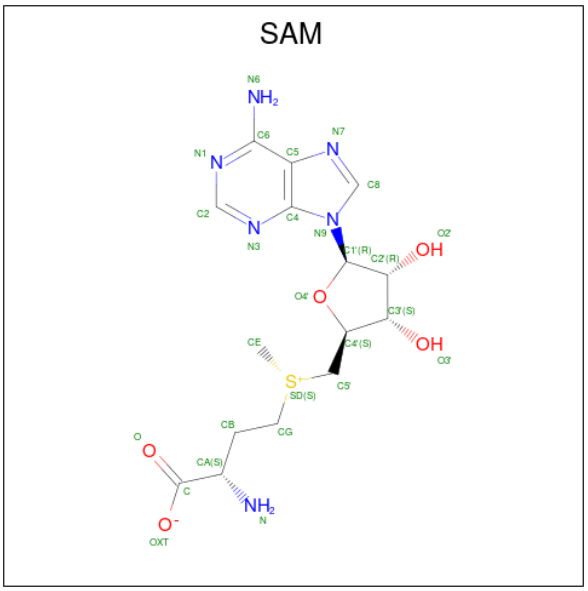
Mol	Chain	Residues	Atoms	AltConf
60	A	88	Total Mg 88 88	0
60	I	1	Total Mg 1 1	0
60	M	1	Total Mg 1 1	0
60	O	1	Total Mg 1 1	0
60	W	1	Total Mg 1 1	0
60	g	1	Total Mg 1 1	0
60	o	1	Total Mg 1 1	0

- Molecule 61 is S-(2-{[N-(2-HYDROXY-4-{[HYDROXY(OXIDO)PHOSPHINO]OXY}-3,3-DIMETHYLBUTANOYL)-BETA-ALANYL]AMINO}ETHYL) DECANETHIOATE (three-letter code: PM8) (formula: $C_{21}H_{41}N_2O_7PS$).



Mol	Chain	Residues	Atoms	AltConf
61	w	1	Total C N O P S 32 21 2 7 1 1	0

- Molecule 62 is S-ADENOSYLMETHIONINE (three-letter code: SAM) (formula: $C_{15}H_{22}N_6O_5S$).



Mol	Chain	Residues	Atoms					AltConf
62	x	1	Total	C	N	O	S	0
			27	15	6	5	1	

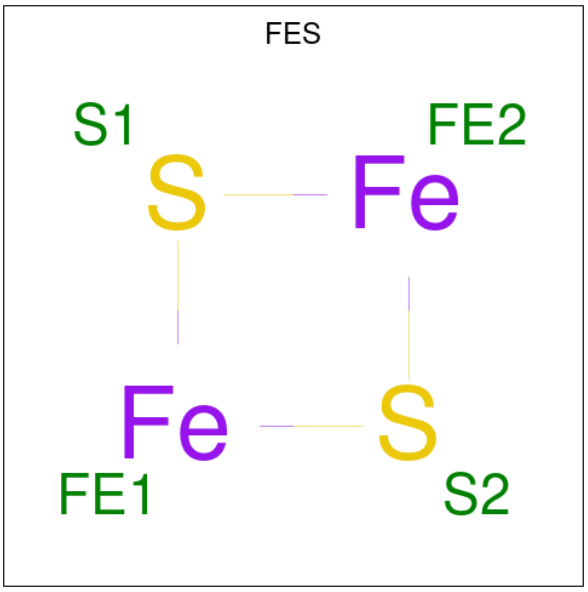
- Molecule 63 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
63	0	1	Total	Zn	0
			1	1	
63	4	1	Total	Zn	0
			1	1	

- Molecule 64 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		AltConf
64	A	10	Total	K	0
			10	10	

- Molecule 65 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).



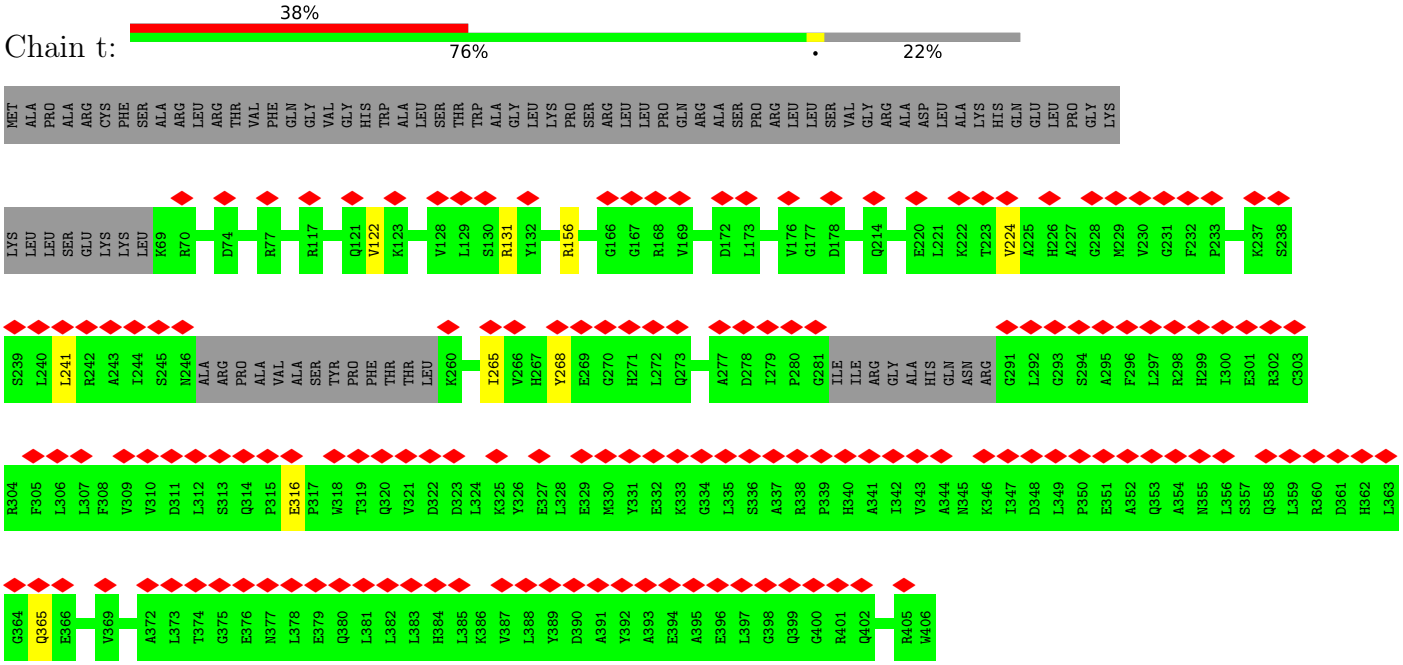
Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
65	r	1	4	2	2	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

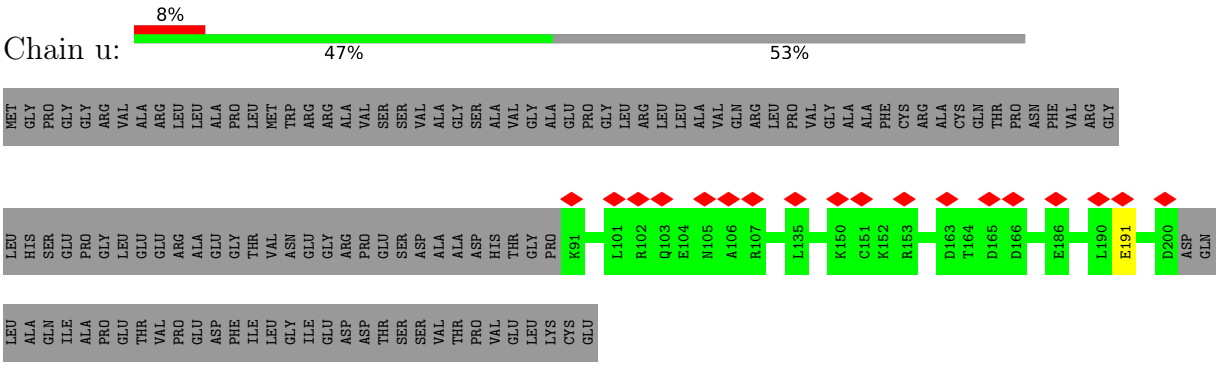
• Molecule 1: Mitochondrial ribosome-associated GTPase 2

Chain t:



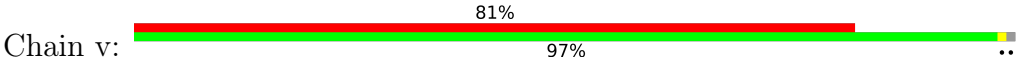
• Molecule 2: Mitochondrial assembly of ribosomal large subunit protein 1

Chain u:

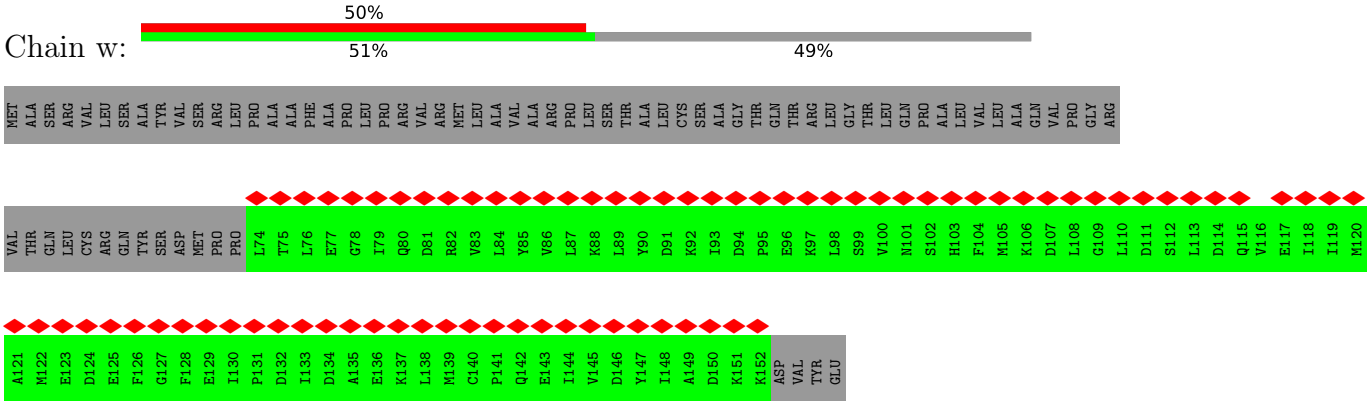


• Molecule 3: MIEF1 upstream open reading frame protein

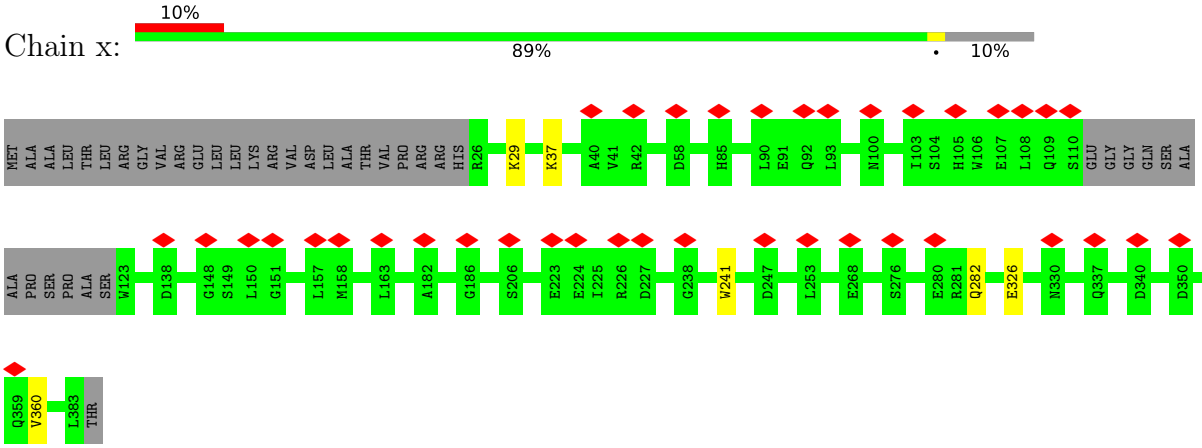
Chain v:



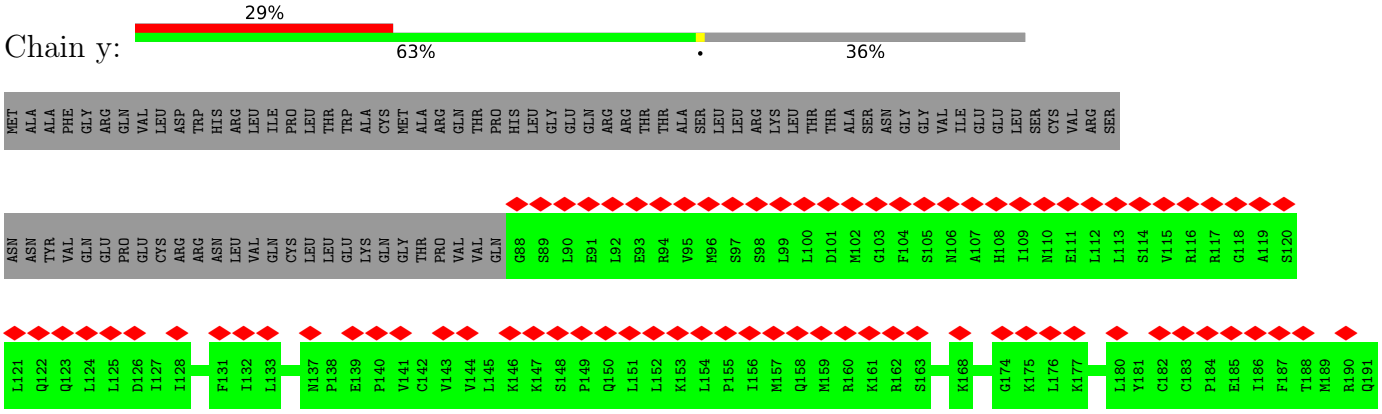
• Molecule 4: Acyl carrier protein, mitochondrial

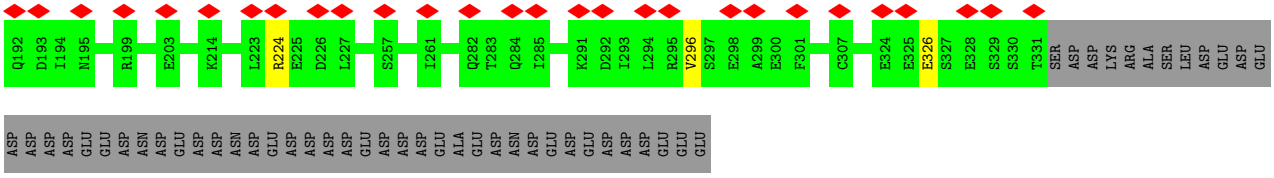


• Molecule 5: 5-methylcytosine rRNA methyltransferase NSUN4



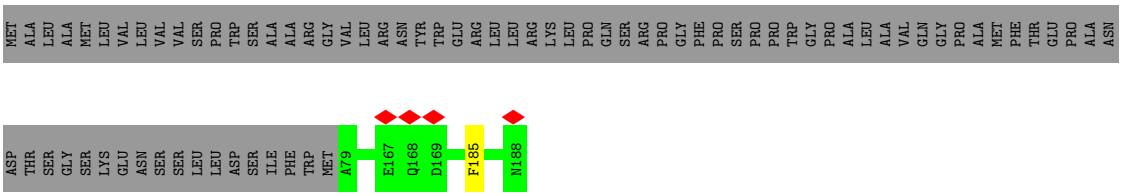
• Molecule 6: Transcription termination factor 4, mitochondrial





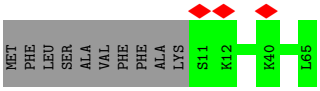
• Molecule 7: 39S ribosomal protein L32, mitochondrial

Chain 0:



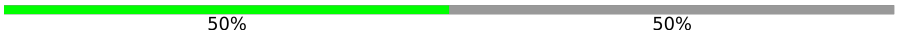
• Molecule 8: 39S ribosomal protein L33, mitochondrial

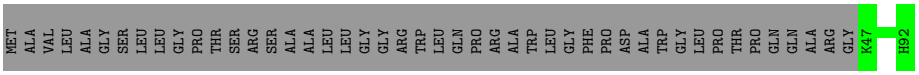
Chain 1:



• Molecule 9: 39S ribosomal protein L34, mitochondrial

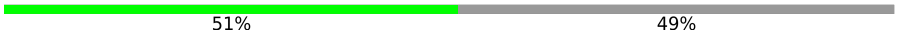
Chain 2:

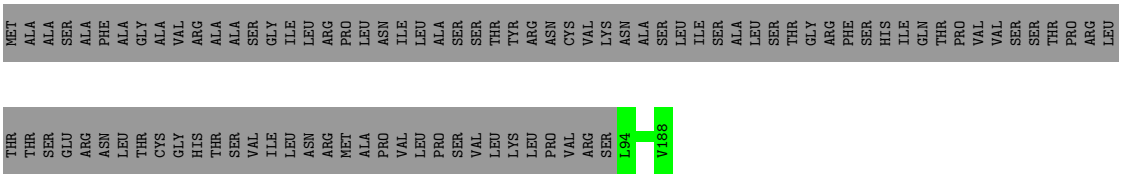




• Molecule 10: 39S ribosomal protein L35, mitochondrial

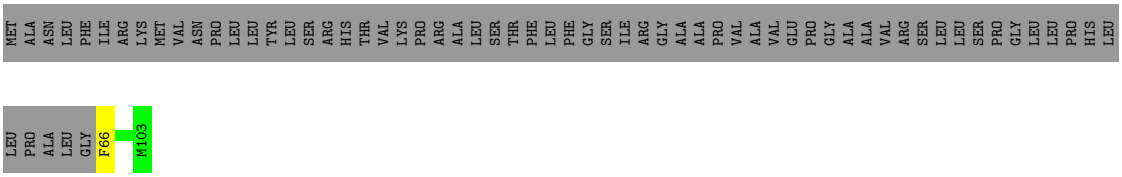
Chain 3:





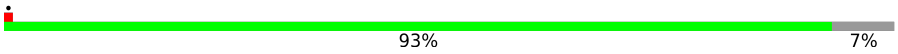
• Molecule 11: 39S ribosomal protein L36, mitochondrial

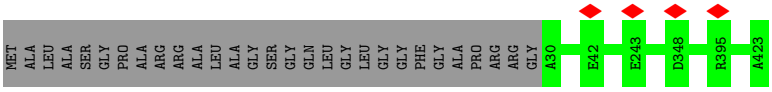
Chain 4:



• Molecule 12: 39S ribosomal protein L37, mitochondrial

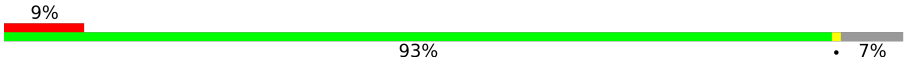
Chain 5:

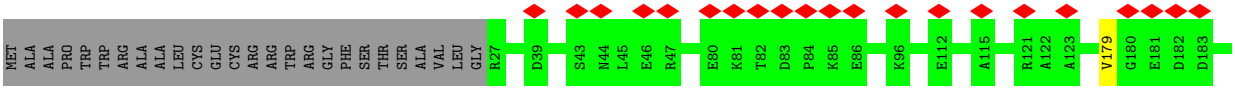


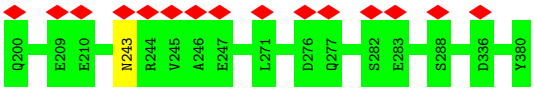


• Molecule 13: 39S ribosomal protein L38, mitochondrial

Chain 6:

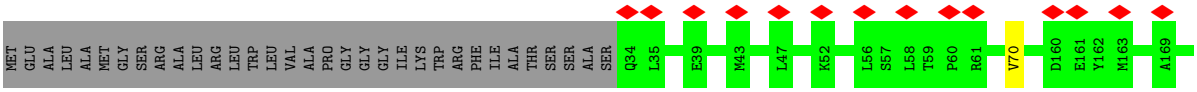


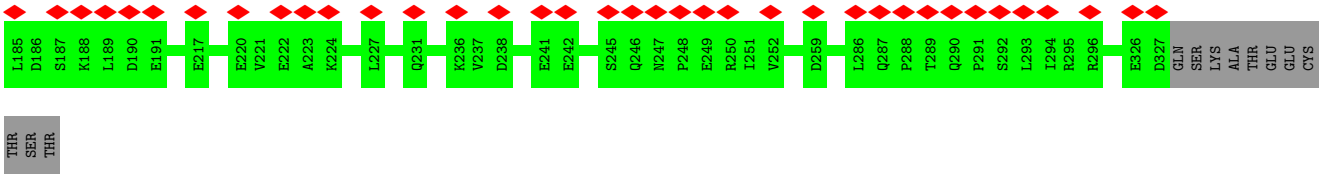




• Molecule 14: 39S ribosomal protein L39, mitochondrial

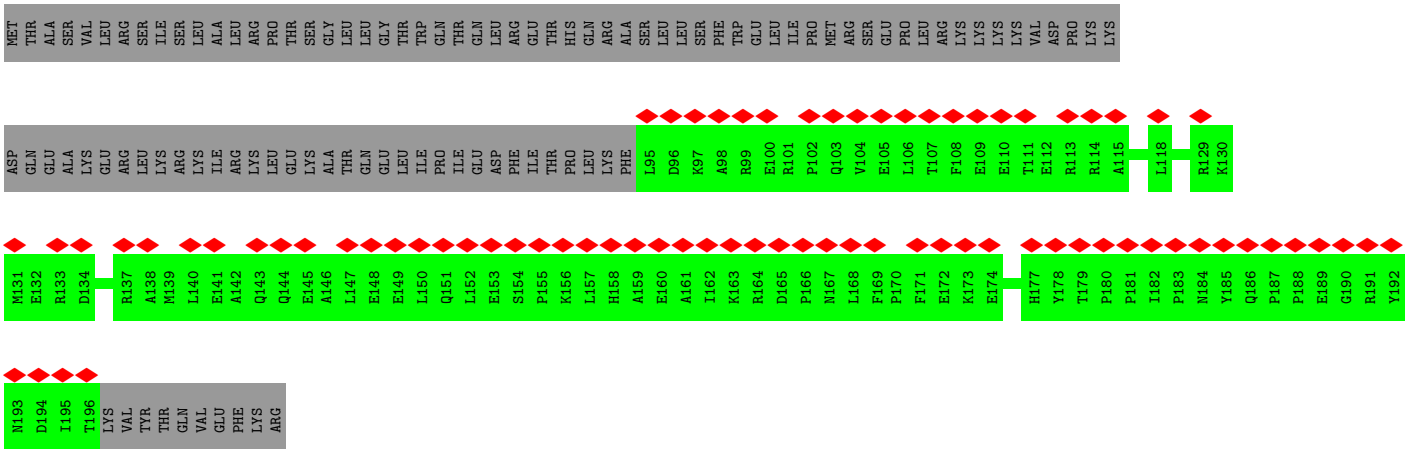
Chain 7:





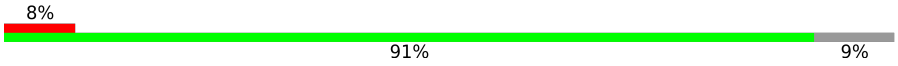
• Molecule 15: 39S ribosomal protein L40, mitochondrial

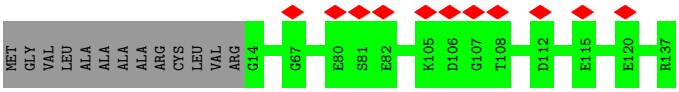
Chain 8:



• Molecule 16: 39S ribosomal protein L41, mitochondrial

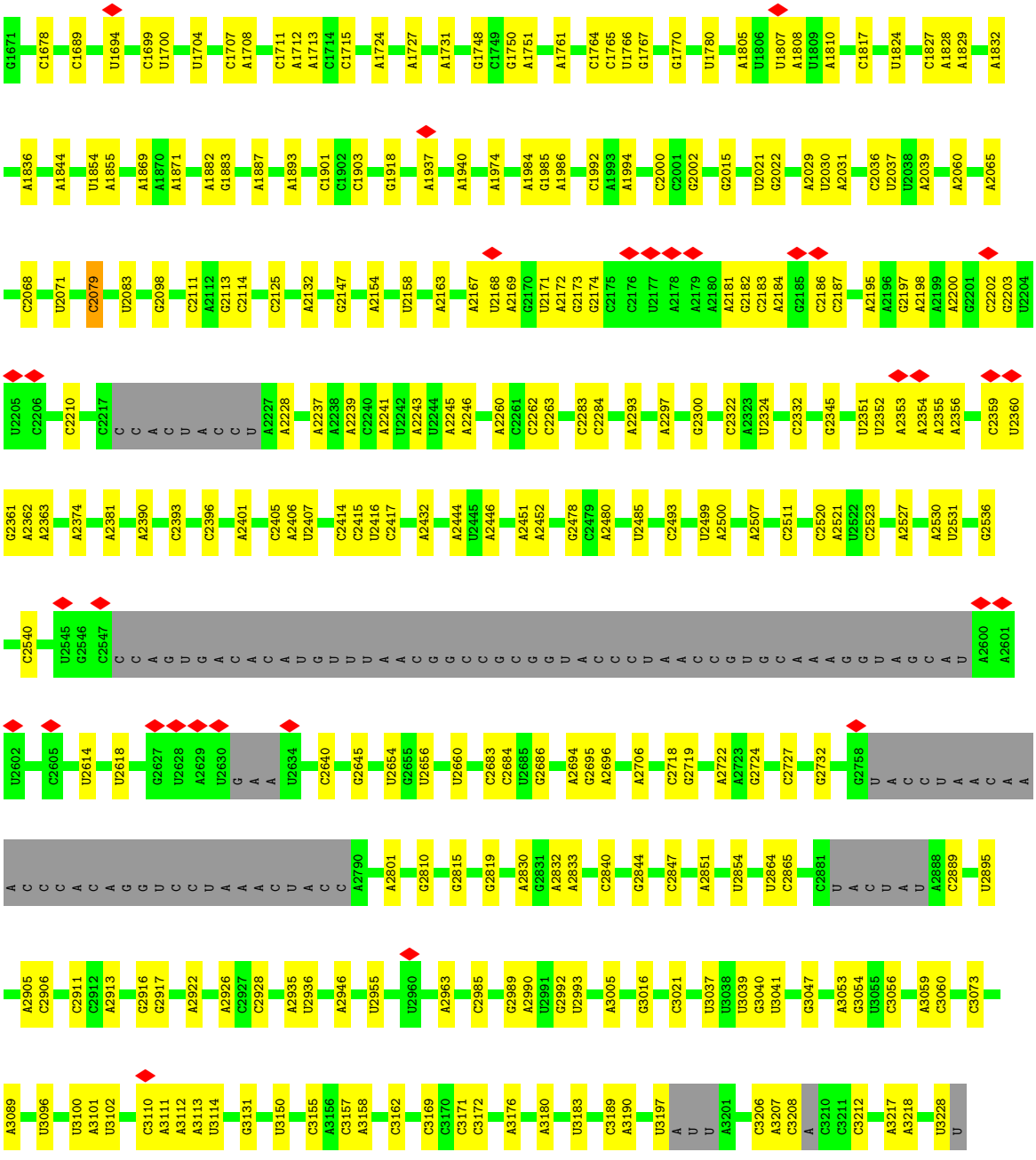
Chain 9:





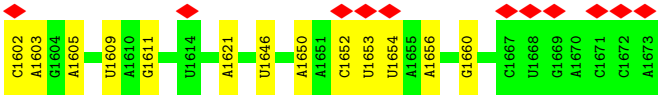
• Molecule 17: 16S mitochondrial rRNA

Chain A:

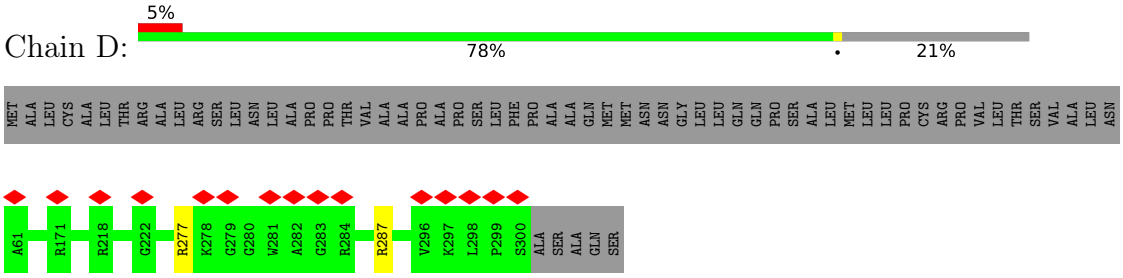


• Molecule 18: mitochondrial tRNAVal

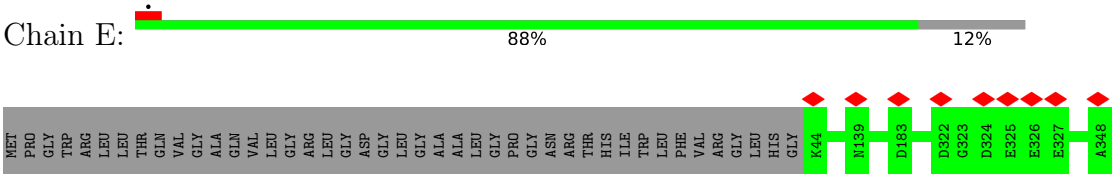
Chain B:



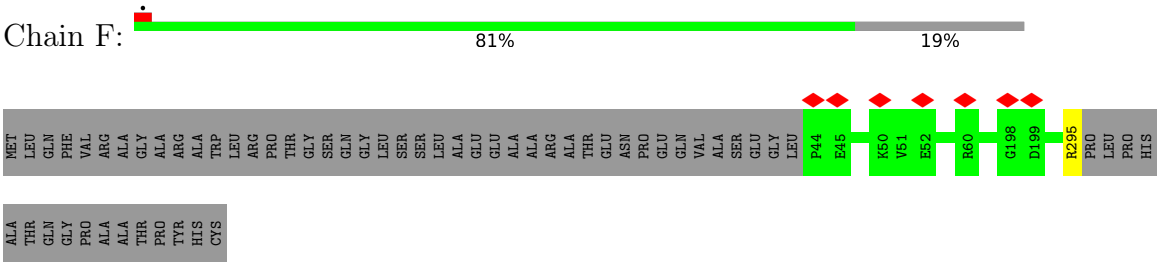
• Molecule 19: 39S ribosomal protein L2, mitochondrial



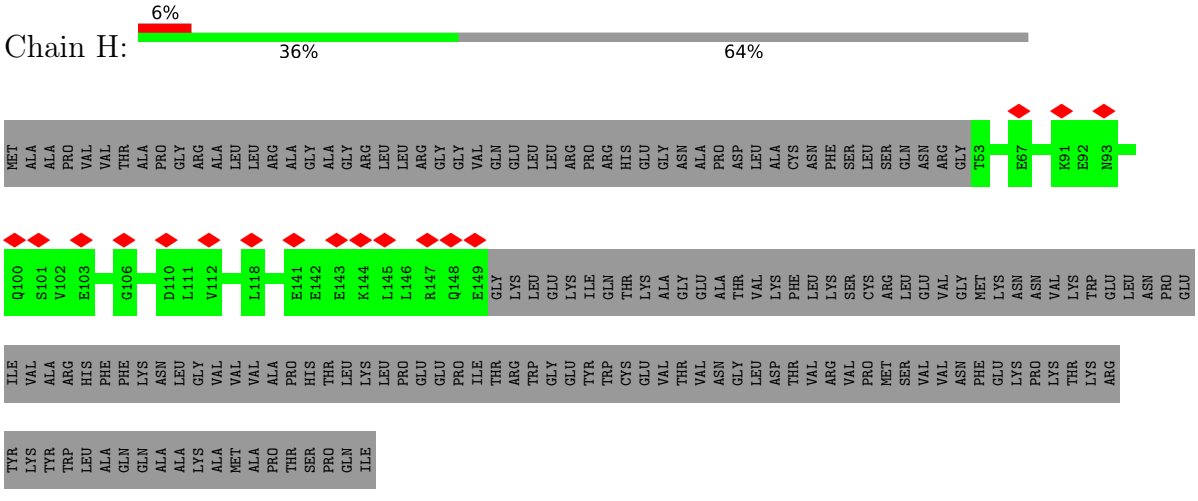
• Molecule 20: 39S ribosomal protein L3, mitochondrial



• Molecule 21: 39S ribosomal protein L4, mitochondrial

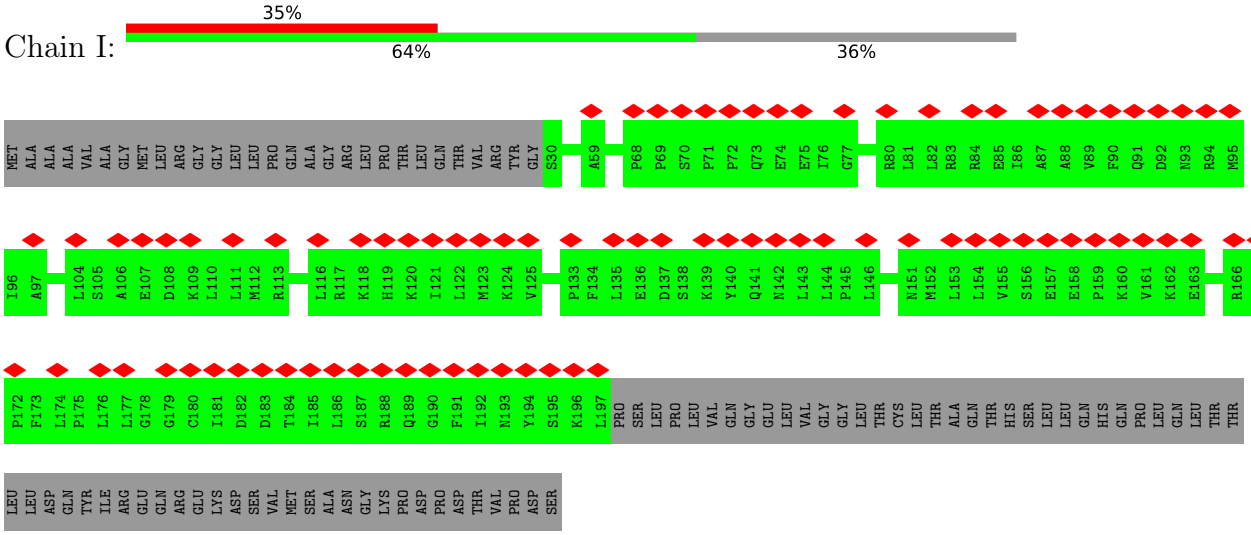


• Molecule 22: 39S ribosomal protein L9, mitochondrial



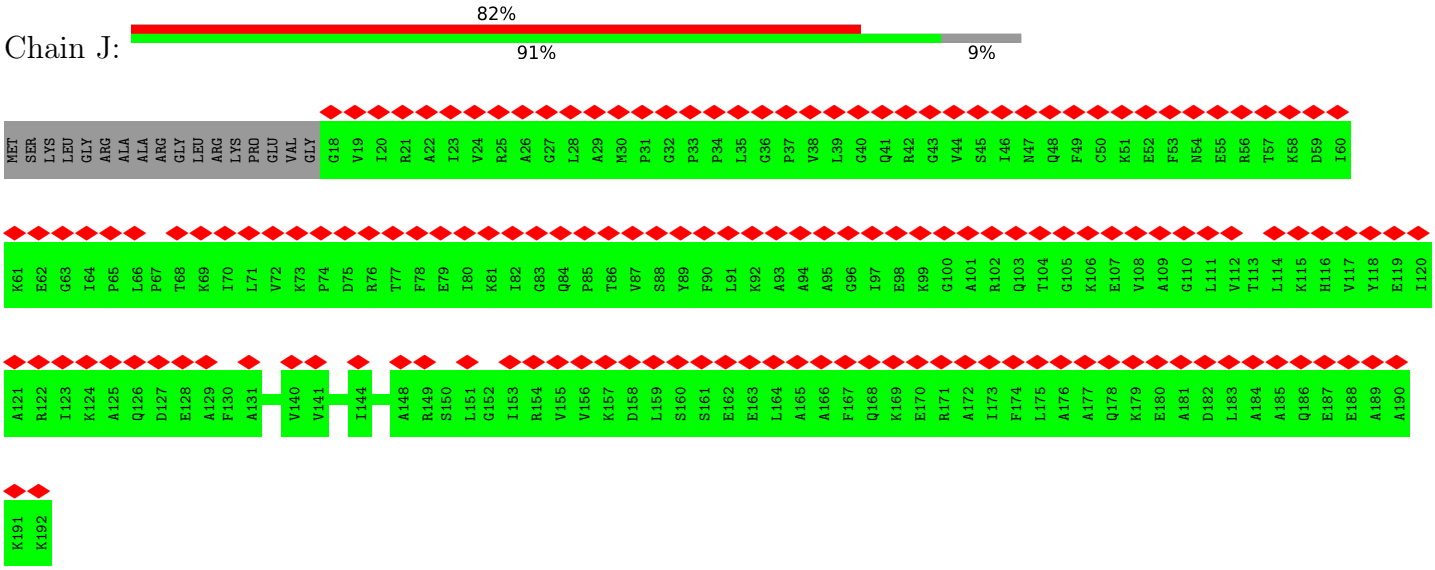
• Molecule 23: 39S ribosomal protein L10, mitochondrial

Chain I:



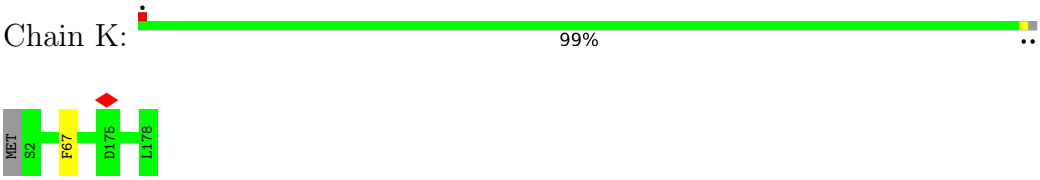
• Molecule 24: 39S ribosomal protein L11, mitochondrial

Chain J:



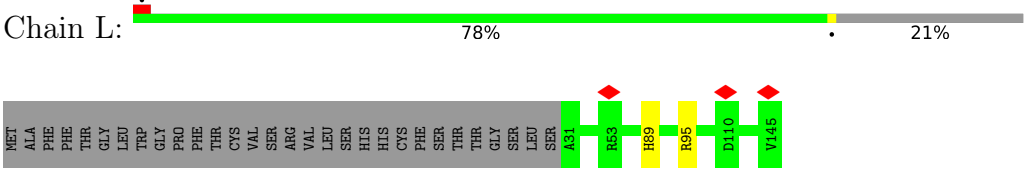
• Molecule 25: 39S ribosomal protein L13, mitochondrial

Chain K:



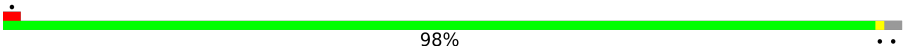
• Molecule 26: 39S ribosomal protein L14, mitochondrial

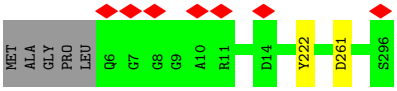
Chain L:



• Molecule 27: 39S ribosomal protein L15, mitochondrial

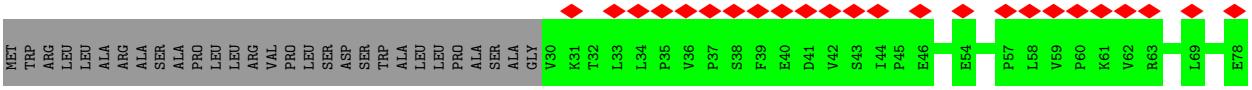
Chain M:

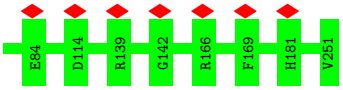




• Molecule 28: 39S ribosomal protein L16, mitochondrial

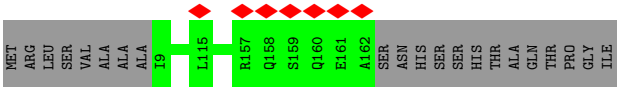
Chain N:





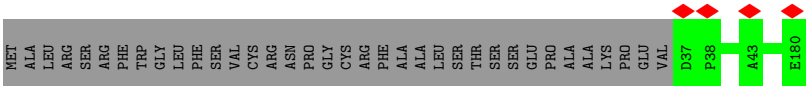
• Molecule 29: 39S ribosomal protein L17, mitochondrial

Chain O:



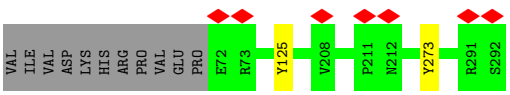
• Molecule 30: 39S ribosomal protein L18, mitochondrial

Chain P:



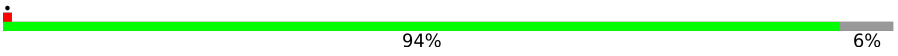
• Molecule 31: 39S ribosomal protein L19, mitochondrial

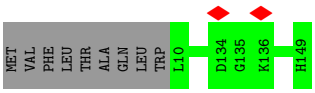
Chain Q:



• Molecule 32: 39S ribosomal protein L20, mitochondrial

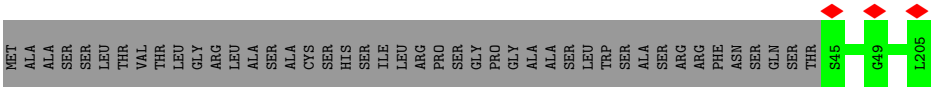
Chain R:





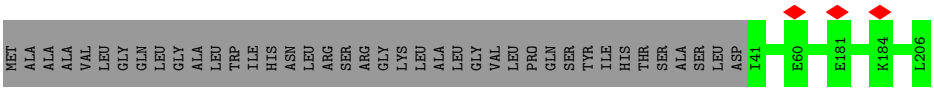
• Molecule 33: 39S ribosomal protein L21, mitochondrial

Chain S:



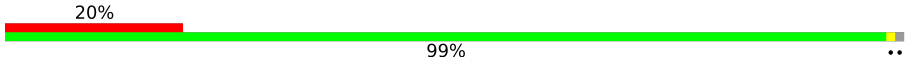
• Molecule 34: 39S ribosomal protein L22, mitochondrial

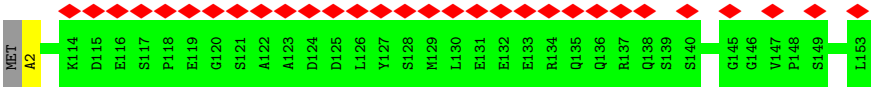
Chain T:



• Molecule 35: 39S ribosomal protein L23, mitochondrial

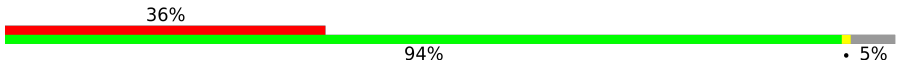
Chain U:

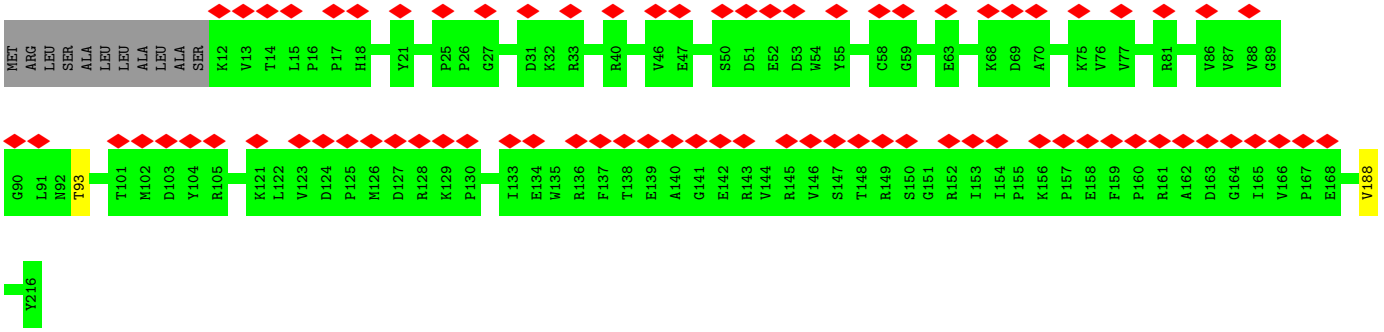




• Molecule 36: 39S ribosomal protein L24, mitochondrial

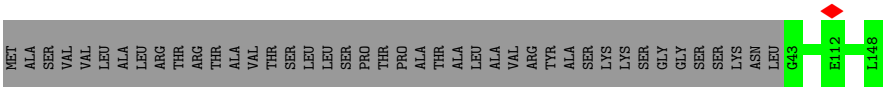
Chain V:





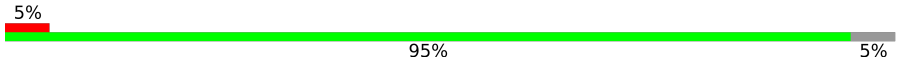
• Molecule 37: 39S ribosomal protein L27, mitochondrial

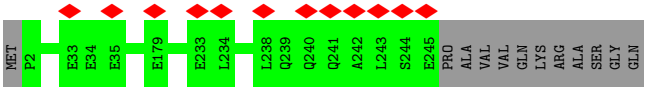
Chain W:



• Molecule 38: 39S ribosomal protein L28, mitochondrial

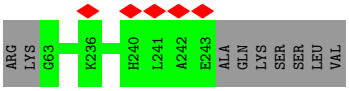
Chain X:





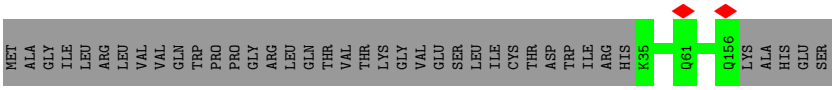
• Molecule 39: 39S ribosomal protein L47, mitochondrial

Chain Y:



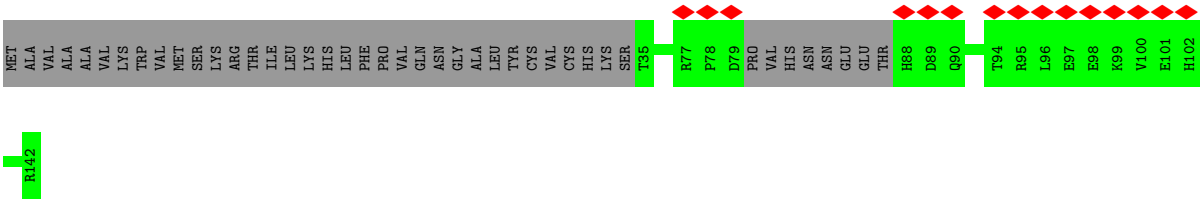
• Molecule 40: 39S ribosomal protein L30, mitochondrial

Chain Z:



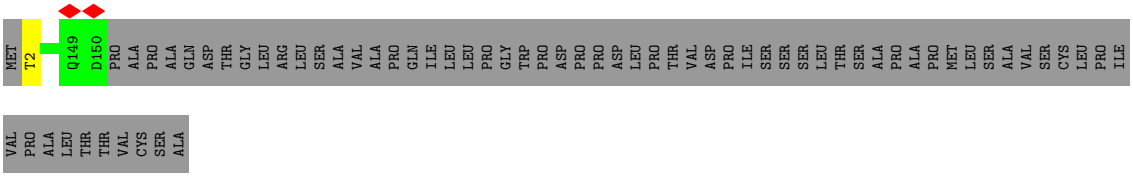
• Molecule 41: 39S ribosomal protein L42, mitochondrial

Chain a:



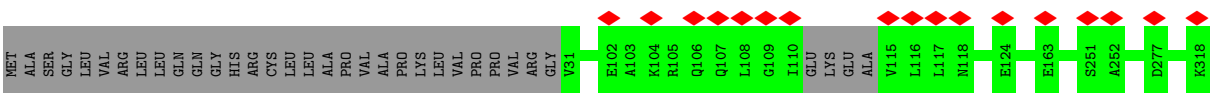
• Molecule 42: 39S ribosomal protein L43, mitochondrial

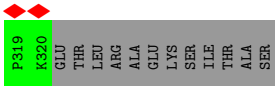
Chain b:



• Molecule 43: 39S ribosomal protein L44, mitochondrial

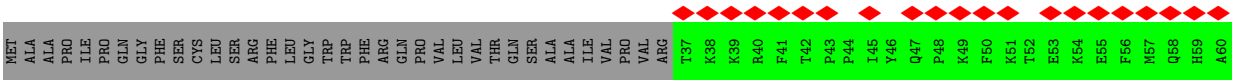
Chain c:

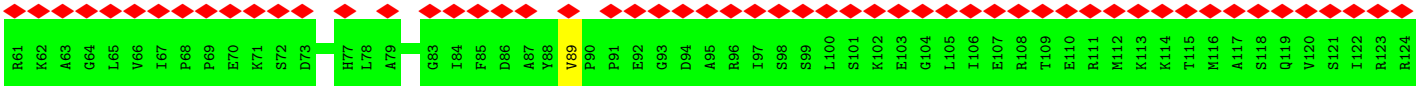


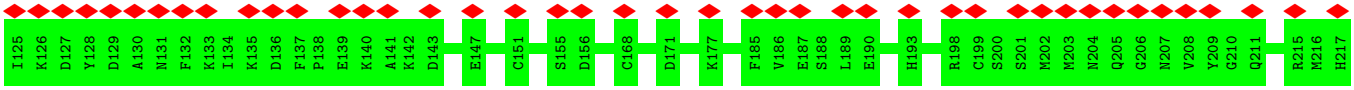


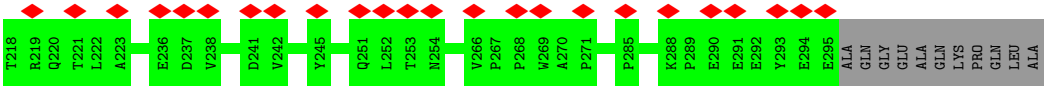
• Molecule 44: 39S ribosomal protein L45, mitochondrial

Chain d:



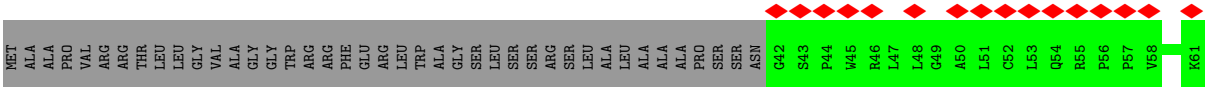


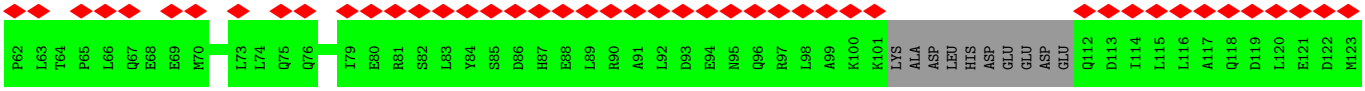


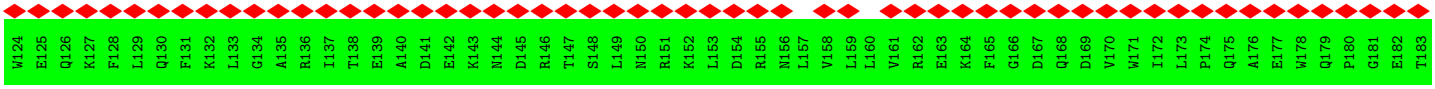


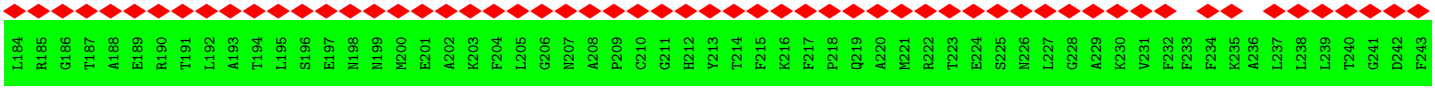
• Molecule 45: 39S ribosomal protein L46, mitochondrial

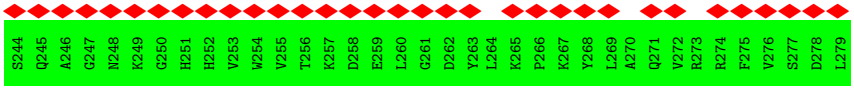
Chain e:





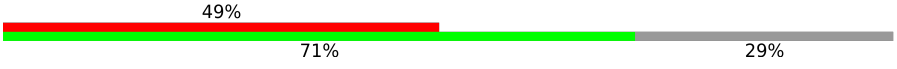


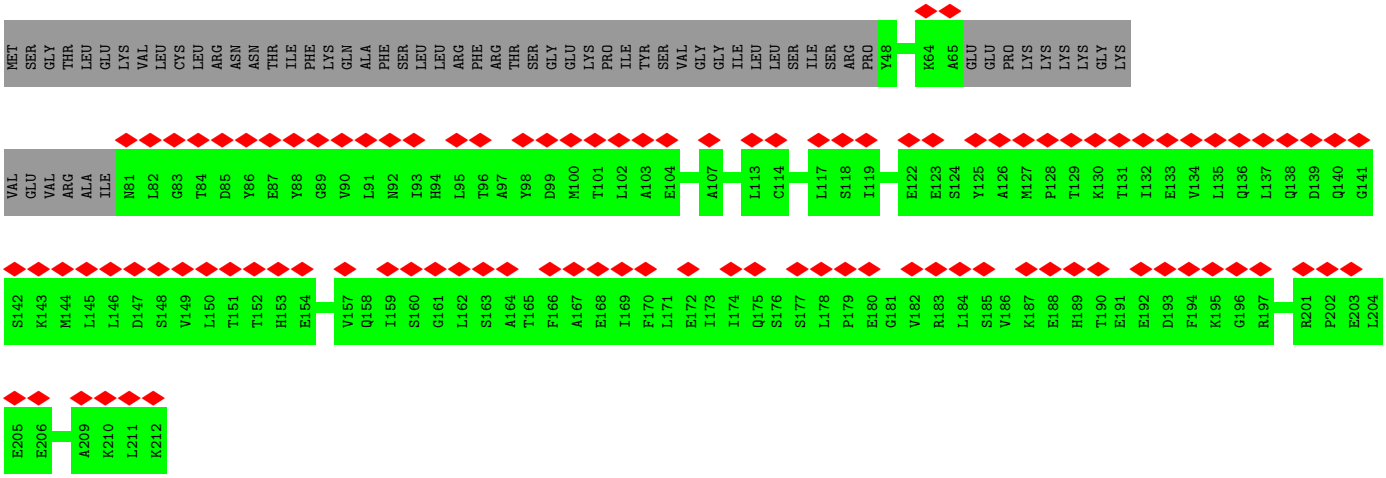




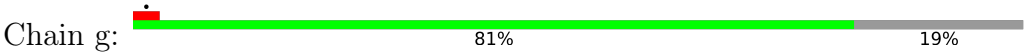
• Molecule 46: 39S ribosomal protein L48, mitochondrial

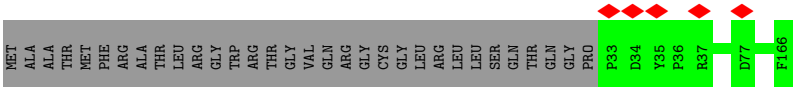
Chain f:



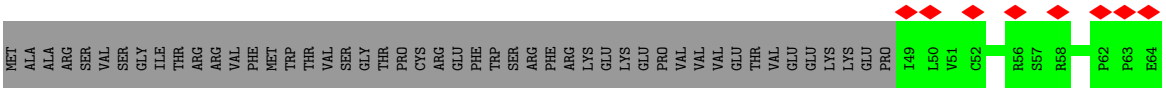


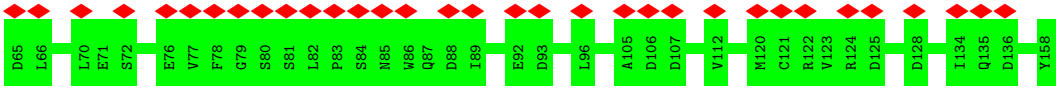
• Molecule 47: 39S ribosomal protein L49, mitochondrial





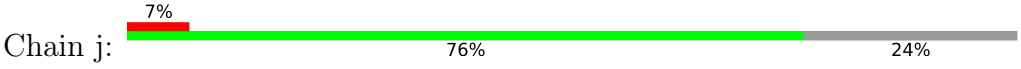
• Molecule 48: 39S ribosomal protein L50, mitochondrial

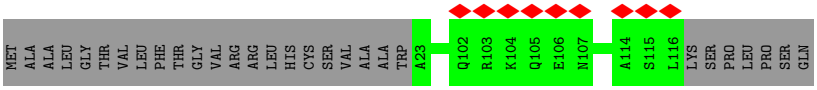




• Molecule 49: 39S ribosomal protein L51, mitochondrial

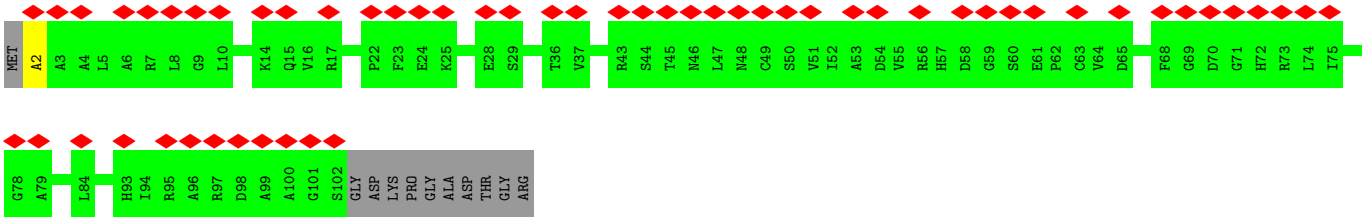
• Molecule 50: 39S ribosomal protein L52, mitochondrial





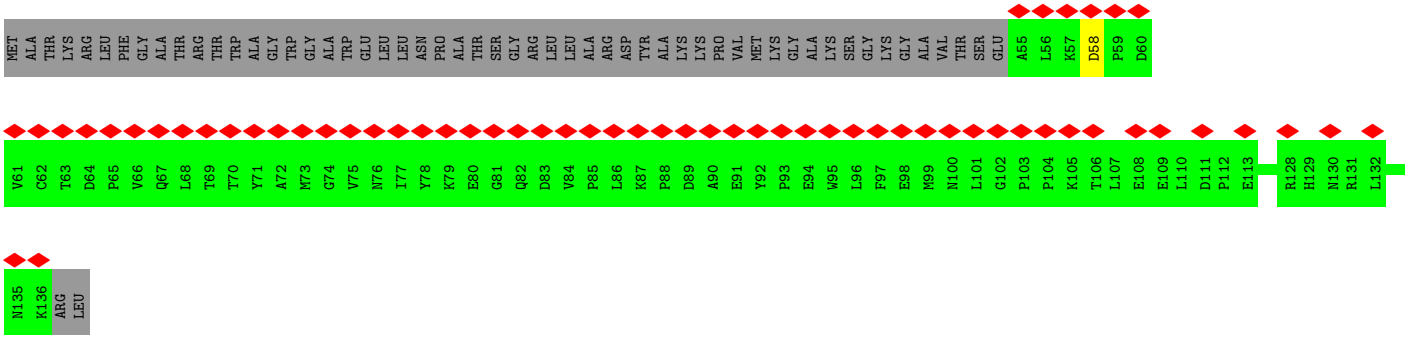
• Molecule 51: 39S ribosomal protein L53, mitochondrial

Chain k:



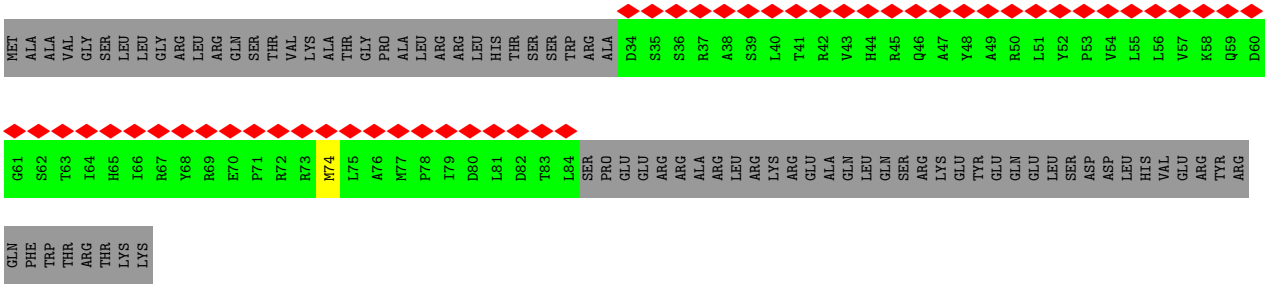
• Molecule 52: 39S ribosomal protein L54, mitochondrial

Chain l:



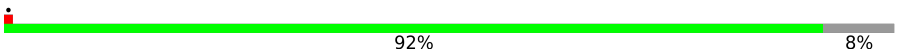
• Molecule 53: 39S ribosomal protein L55, mitochondrial

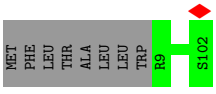
Chain m:



• Molecule 54: Ribosomal protein 63, mitochondrial

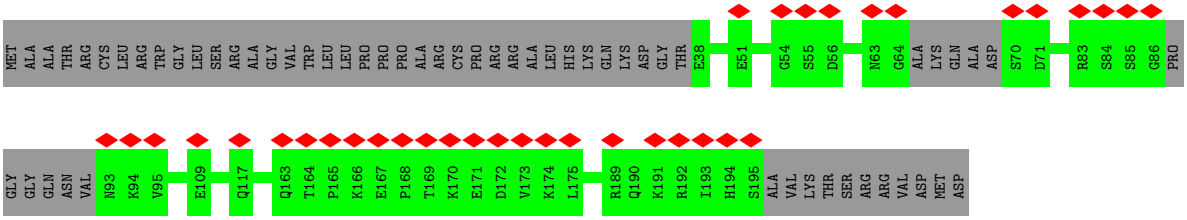
Chain o:



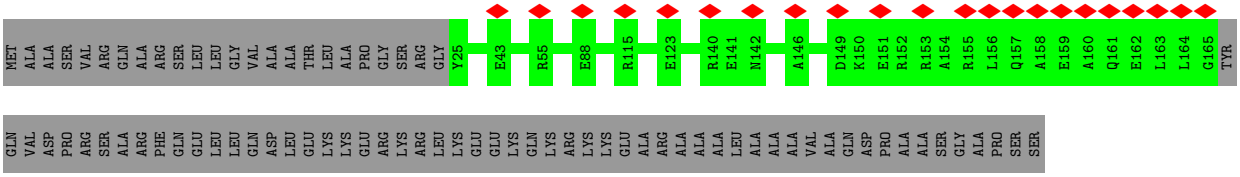


• Molecule 55: Peptidyl-tRNA hydrolase ICT1, mitochondrial

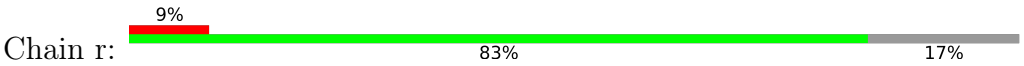
Chain p:

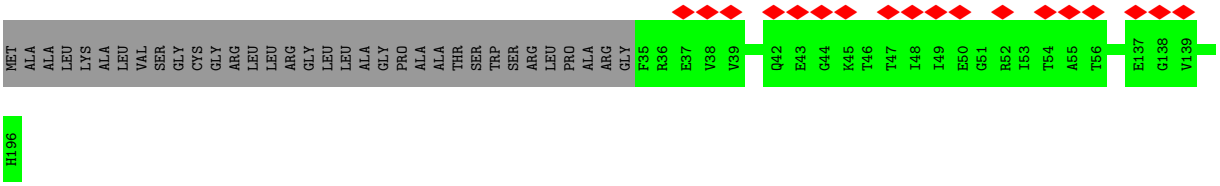


• Molecule 56: Growth arrest and DNA damage-inducible proteins-interacting protein 1

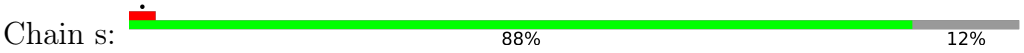


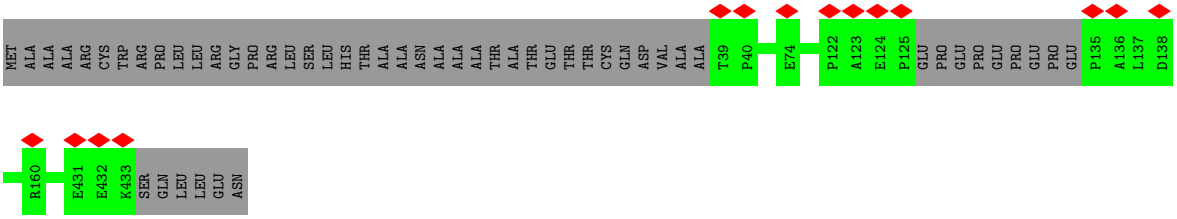
• Molecule 57: 39S ribosomal protein S18a, mitochondrial





• Molecule 58: 39S ribosomal protein S30, mitochondrial





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	62552	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	60	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.962	Depositor
Minimum map value	-0.925	Depositor
Average map value	0.006	Depositor
Map value standard deviation	0.105	Depositor
Recommended contour level	0.45	Depositor
Map size (Å)	474.87997, 474.87997, 474.87997	wwPDB
Map dimensions	448, 448, 448	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: FES, K, OMG, PM8, AYA, ZN, THC, GDP, OMU, SAC, SAM, MG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	t	0.24	0/2445	0.47	0/3301
2	u	0.23	0/941	0.45	0/1270
3	v	0.23	0/597	0.52	0/796
4	w	0.23	0/647	0.39	0/871
5	x	0.24	0/2814	0.46	0/3816
6	y	0.23	0/2011	0.43	0/2702
7	0	0.24	0/913	0.50	0/1224
8	1	0.24	0/460	0.53	0/610
9	2	0.23	0/383	0.52	0/507
10	3	0.24	0/853	0.50	0/1136
11	4	0.24	0/350	0.53	0/461
12	5	0.24	0/3305	0.46	0/4502
13	6	0.24	0/3043	0.48	0/4140
14	7	0.24	0/2447	0.43	0/3310
15	8	0.24	0/880	0.44	0/1188
16	9	0.26	0/1025	0.47	0/1379
17	A	0.18	0/34465	0.69	8/53638 (0.0%)
18	B	0.28	1/1700 (0.1%)	0.66	0/2641
19	D	0.24	0/1910	0.54	0/2569
20	E	0.24	0/2475	0.44	0/3355
21	F	0.24	0/2090	0.48	0/2842
22	H	0.23	0/816	0.51	0/1097
23	I	0.24	0/1388	0.46	0/1875
24	J	0.24	0/1348	0.44	0/1813
25	K	0.24	0/1490	0.46	0/2021
26	L	0.24	0/905	0.51	0/1218
27	M	0.25	0/2381	0.50	0/3212
28	N	0.24	0/1833	0.48	0/2468
29	O	0.23	0/1283	0.50	0/1727
30	P	0.23	0/1199	0.51	0/1623
31	Q	0.25	0/1884	0.48	0/2535
32	R	0.24	0/1175	0.50	0/1572

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
33	S	0.24	0/1320	0.50	0/1789
34	T	0.25	0/1403	0.47	0/1886
35	U	0.25	0/1274	0.50	0/1723
36	V	0.23	0/1721	0.48	0/2333
37	W	0.25	0/857	0.47	0/1155
38	X	0.24	0/2099	0.44	0/2837
39	Y	0.23	0/1593	0.47	0/2136
40	Z	0.23	0/1021	0.46	0/1378
41	a	0.24	0/866	0.48	0/1174
42	b	0.24	0/1203	0.52	0/1627
43	c	0.24	0/2347	0.44	0/3171
44	d	0.23	0/2181	0.45	0/2949
45	e	0.23	0/1885	0.45	0/2542
46	f	0.24	0/1216	0.43	0/1638
47	g	0.25	0/1151	0.48	0/1569
48	h	0.23	0/918	0.44	0/1249
49	i	0.24	0/850	0.49	0/1135
50	j	0.23	0/760	0.45	0/1023
51	k	0.23	0/777	0.49	0/1048
52	l	0.23	0/707	0.44	0/960
53	m	0.22	0/426	0.56	0/575
54	o	0.23	0/819	0.51	0/1097
55	p	0.22	0/1223	0.48	0/1641
56	q	0.23	0/1208	0.48	0/1633
57	r	0.24	0/1362	0.49	0/1846
58	s	0.24	0/3239	0.48	0/4400
All	All	0.23	1/115882 (0.0%)	0.56	8/163933 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
18	B	1602	C	OP3-P	-10.54	1.48	1.61

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
17	A	1711	C	C2-N1-C1'	7.94	127.53	118.80
17	A	1711	C	N1-C2-O2	7.72	123.53	118.90
17	A	1711	C	N3-C2-O2	-6.28	117.50	121.90
17	A	1711	C	C6-N1-C1'	-5.47	114.23	120.80
17	A	2079	C	C2-N1-C1'	5.39	124.73	118.80

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	t	310/406 (76%)	303 (98%)	7 (2%)	0	100	100
2	u	108/234 (46%)	105 (97%)	3 (3%)	0	100	100
3	v	67/70 (96%)	67 (100%)	0	0	100	100
4	w	77/156 (49%)	72 (94%)	5 (6%)	0	100	100
5	x	342/384 (89%)	338 (99%)	4 (1%)	0	100	100
6	y	242/381 (64%)	240 (99%)	2 (1%)	0	100	100
7	0	108/188 (57%)	107 (99%)	1 (1%)	0	100	100
8	1	53/65 (82%)	53 (100%)	0	0	100	100
9	2	44/92 (48%)	42 (96%)	2 (4%)	0	100	100
10	3	93/188 (50%)	92 (99%)	1 (1%)	0	100	100
11	4	36/103 (35%)	36 (100%)	0	0	100	100
12	5	392/423 (93%)	387 (99%)	5 (1%)	0	100	100
13	6	352/380 (93%)	342 (97%)	10 (3%)	0	100	100
14	7	292/338 (86%)	288 (99%)	4 (1%)	0	100	100
15	8	100/206 (48%)	100 (100%)	0	0	100	100
16	9	122/137 (89%)	121 (99%)	1 (1%)	0	100	100
19	D	238/305 (78%)	233 (98%)	5 (2%)	0	100	100
20	E	303/348 (87%)	298 (98%)	5 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
21	F	250/311 (80%)	246 (98%)	4 (2%)	0	100	100
22	H	95/267 (36%)	94 (99%)	1 (1%)	0	100	100
23	I	166/261 (64%)	165 (99%)	1 (1%)	0	100	100
24	J	173/192 (90%)	173 (100%)	0	0	100	100
25	K	175/178 (98%)	173 (99%)	2 (1%)	0	100	100
26	L	113/145 (78%)	113 (100%)	0	0	100	100
27	M	289/296 (98%)	285 (99%)	4 (1%)	0	100	100
28	N	220/251 (88%)	220 (100%)	0	0	100	100
29	O	152/175 (87%)	149 (98%)	3 (2%)	0	100	100
30	P	142/180 (79%)	138 (97%)	4 (3%)	0	100	100
31	Q	219/292 (75%)	218 (100%)	1 (0%)	0	100	100
32	R	138/149 (93%)	137 (99%)	1 (1%)	0	100	100
33	S	159/205 (78%)	159 (100%)	0	0	100	100
34	T	164/206 (80%)	163 (99%)	1 (1%)	0	100	100
35	U	150/153 (98%)	149 (99%)	1 (1%)	0	100	100
36	V	203/216 (94%)	202 (100%)	1 (0%)	0	100	100
37	W	104/148 (70%)	101 (97%)	3 (3%)	0	100	100
38	X	242/256 (94%)	241 (100%)	1 (0%)	0	100	100
39	Y	179/250 (72%)	179 (100%)	0	0	100	100
40	Z	120/161 (74%)	117 (98%)	3 (2%)	0	100	100
41	a	96/142 (68%)	96 (100%)	0	0	100	100
42	b	147/215 (68%)	145 (99%)	2 (1%)	0	100	100
43	c	282/332 (85%)	280 (99%)	2 (1%)	0	100	100
44	d	257/306 (84%)	254 (99%)	3 (1%)	0	100	100
45	e	224/279 (80%)	222 (99%)	2 (1%)	0	100	100
46	f	146/212 (69%)	144 (99%)	2 (1%)	0	100	100
47	g	132/166 (80%)	131 (99%)	1 (1%)	0	100	100
48	h	108/158 (68%)	105 (97%)	3 (3%)	0	100	100
49	i	95/128 (74%)	95 (100%)	0	0	100	100
50	j	92/123 (75%)	89 (97%)	3 (3%)	0	100	100
51	k	99/112 (88%)	98 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
52	l	80/138 (58%)	80 (100%)	0	0	100	100
53	m	49/128 (38%)	47 (96%)	2 (4%)	0	100	100
54	o	92/102 (90%)	92 (100%)	0	0	100	100
55	p	141/206 (68%)	138 (98%)	3 (2%)	0	100	100
56	q	139/222 (63%)	139 (100%)	0	0	100	100
57	r	160/196 (82%)	159 (99%)	1 (1%)	0	100	100
58	s	382/439 (87%)	376 (98%)	6 (2%)	0	100	100
All	All	9453/12300 (77%)	9336 (99%)	117 (1%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	t	248/320 (78%)	239 (96%)	9 (4%)	35	67
2	u	104/200 (52%)	103 (99%)	1 (1%)	76	90
3	v	59/60 (98%)	58 (98%)	1 (2%)	60	83
4	w	73/136 (54%)	73 (100%)	0	100	100
5	x	299/328 (91%)	293 (98%)	6 (2%)	55	80
6	y	226/350 (65%)	223 (99%)	3 (1%)	69	87
7	0	99/164 (60%)	98 (99%)	1 (1%)	76	90
8	1	52/60 (87%)	52 (100%)	0	100	100
9	2	40/72 (56%)	40 (100%)	0	100	100
10	3	88/166 (53%)	88 (100%)	0	100	100
11	4	37/89 (42%)	36 (97%)	1 (3%)	44	74
12	5	353/368 (96%)	353 (100%)	0	100	100
13	6	313/332 (94%)	311 (99%)	2 (1%)	86	94
14	7	270/303 (89%)	269 (100%)	1 (0%)	91	96

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
15	8	93/190 (49%)	93 (100%)	0	100	100
16	9	104/112 (93%)	104 (100%)	0	100	100
19	D	194/245 (79%)	192 (99%)	2 (1%)	76	90
20	E	260/290 (90%)	260 (100%)	0	100	100
21	F	219/262 (84%)	218 (100%)	1 (0%)	88	94
22	H	88/228 (39%)	88 (100%)	0	100	100
23	I	155/232 (67%)	155 (100%)	0	100	100
24	J	138/150 (92%)	138 (100%)	0	100	100
25	K	154/155 (99%)	153 (99%)	1 (1%)	86	94
26	L	98/124 (79%)	96 (98%)	2 (2%)	55	80
27	M	246/249 (99%)	244 (99%)	2 (1%)	81	92
28	N	189/211 (90%)	189 (100%)	0	100	100
29	O	134/150 (89%)	134 (100%)	0	100	100
30	P	126/155 (81%)	126 (100%)	0	100	100
31	Q	203/256 (79%)	201 (99%)	2 (1%)	76	90
32	R	118/126 (94%)	118 (100%)	0	100	100
33	S	146/180 (81%)	146 (100%)	0	100	100
34	T	146/176 (83%)	146 (100%)	0	100	100
35	U	134/135 (99%)	134 (100%)	0	100	100
36	V	183/191 (96%)	181 (99%)	2 (1%)	73	89
37	W	86/119 (72%)	86 (100%)	0	100	100
38	X	220/229 (96%)	220 (100%)	0	100	100
39	Y	163/223 (73%)	163 (100%)	0	100	100
40	Z	113/147 (77%)	113 (100%)	0	100	100
41	a	96/133 (72%)	96 (100%)	0	100	100
42	b	130/185 (70%)	130 (100%)	0	100	100
43	c	251/288 (87%)	251 (100%)	0	100	100
44	d	237/274 (86%)	236 (100%)	1 (0%)	91	96
45	e	198/236 (84%)	198 (100%)	0	100	100
46	f	133/188 (71%)	133 (100%)	0	100	100
47	g	124/148 (84%)	124 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
48	h	104/148 (70%)	104 (100%)	0	100 100
49	i	86/110 (78%)	86 (100%)	0	100 100
50	j	74/97 (76%)	74 (100%)	0	100 100
51	k	83/90 (92%)	83 (100%)	0	100 100
52	l	76/116 (66%)	75 (99%)	1 (1%)	69 87
53	m	46/113 (41%)	45 (98%)	1 (2%)	52 78
54	o	80/87 (92%)	80 (100%)	0	100 100
55	p	135/181 (75%)	135 (100%)	0	100 100
56	q	119/178 (67%)	119 (100%)	0	100 100
57	r	147/169 (87%)	147 (100%)	0	100 100
58	s	340/381 (89%)	340 (100%)	0	100 100
All	All	8430/10605 (80%)	8390 (100%)	40 (0%)	89 94

5 of 40 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
25	K	67	PHE
36	V	93	THR
26	L	89	HIS
27	M	261	ASP
44	d	89	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 67 such sidechains are listed below:

Mol	Chain	Res	Type
45	e	219	GLN
46	f	189	HIS
58	s	343	GLN
12	5	191	GLN
8	1	52	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
17	A	1445/1559 (92%)	260 (17%)	7 (0%)
18	B	71/72 (98%)	12 (16%)	0

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
All	All	1516/1631 (92%)	272 (17%)	7 (0%)

5 of 272 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
17	A	1678	C
17	A	1689	C
17	A	1694	U
17	A	1699	C
17	A	1700	U

5 of 7 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
17	A	2245	A
17	A	2530	A
17	A	2992	G
17	A	2905	A
17	A	2186	C

5.4 Non-standard residues in protein, DNA, RNA chains (i)

6 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
25	SAC	K	2	25	7,8,9	1.00	0	8,9,11	0.81	0
17	OMG	A	3040	17	18,26,27	1.20	1 (5%)	19,38,41	1.11	2 (10%)
35	AYA	U	2	35	6,7,8	1.30	1 (16%)	5,8,10	1.24	1 (20%)
42	THC	b	2	42	8,9,10	1.04	1 (12%)	9,11,13	0.68	0
51	AYA	k	2	51	6,7,8	1.21	1 (16%)	5,8,10	1.26	1 (20%)
17	OMU	A	3039	17	19,22,23	1.39	3 (15%)	26,31,34	1.90	8 (30%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
25	SAC	K	2	25	-	2/7/8/10	-
17	OMG	A	3040	17	-	0/5/27/28	0/3/3/3
35	AYA	U	2	35	-	1/4/6/8	-
42	THC	b	2	42	-	0/8/10/12	-
51	AYA	k	2	51	-	0/4/6/8	-
17	OMU	A	3039	17	-	0/9/27/28	0/2/2/2

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
17	A	3040	OMG	C6-N1	-3.31	1.32	1.37
17	A	3039	OMU	C4-N3	-3.14	1.32	1.38
17	A	3039	OMU	C2-N3	-2.93	1.32	1.38
35	U	2	AYA	CA-N	-2.57	1.43	1.46
17	A	3039	OMU	C5-C4	-2.39	1.38	1.43

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
17	A	3039	OMU	C4-N3-C2	-4.36	120.83	126.58
17	A	3039	OMU	N3-C2-N1	4.13	120.38	114.89
17	A	3039	OMU	C5-C4-N3	3.69	120.36	114.84
17	A	3039	OMU	O2'-C2'-C1'	-2.88	103.46	109.08
17	A	3039	OMU	O4-C4-C5	-2.78	120.27	125.16

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
25	K	2	SAC	N-CA-CB-OG
25	K	2	SAC	C-CA-CB-OG
35	U	2	AYA	C-CA-N-CT

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 111 ligands modelled in this entry, 107 are monoatomic - leaving 4 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
65	FES	r	201	23,57	0,4,4	-	-	-		
62	SAM	x	401	-	24,29,29	1.22	3 (12%)	23,42,42	1.58	4 (17%)
61	PM8	w	200	4	25,31,31	0.20	0	30,38,38	0.39	0
59	GDP	t	500	60	24,30,30	0.95	1 (4%)	30,47,47	1.32	4 (13%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
65	FES	r	201	23,57	-	-	0/1/1/1
62	SAM	x	401	-	-	4/12/33/33	0/3/3/3
61	PM8	w	200	4	-	10/36/38/38	-
59	GDP	t	500	60	-	1/12/32/32	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
62	x	401	SAM	C2-N3	4.00	1.38	1.32
62	x	401	SAM	C2-N1	2.43	1.38	1.33
59	t	500	GDP	C6-N1	-2.40	1.34	1.37
62	x	401	SAM	OXT-C	-2.14	1.23	1.30

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
62	x	401	SAM	N3-C2-N1	-5.46	120.15	128.68
59	t	500	GDP	PA-O3A-PB	-3.63	120.37	132.83
59	t	500	GDP	C3'-C2'-C1'	3.24	105.85	100.98
62	x	401	SAM	OXT-C-O	-2.78	117.77	124.09
62	x	401	SAM	C3'-C2'-C1'	2.70	105.05	100.98

There are no chirality outliers.

5 of 15 torsion outliers are listed below:

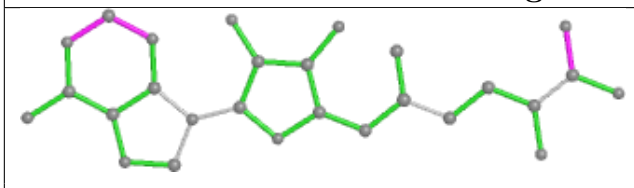
Mol	Chain	Res	Type	Atoms
61	w	200	PM8	O33-C32-C34-O35
61	w	200	PM8	C32-C34-N36-C37
61	w	200	PM8	O1-C1-S1-C43
61	w	200	PM8	C2-C1-S1-C43
62	x	401	SAM	N-CA-CB-CG

There are no ring outliers.

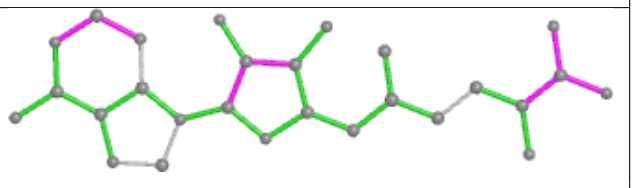
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

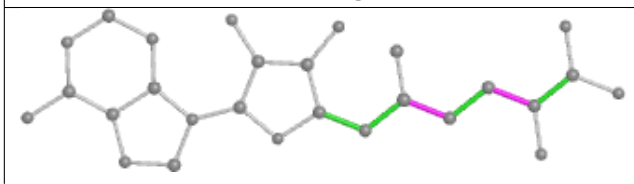
Ligand SAM x 401



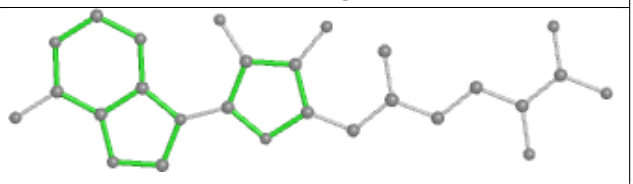
Bond lengths



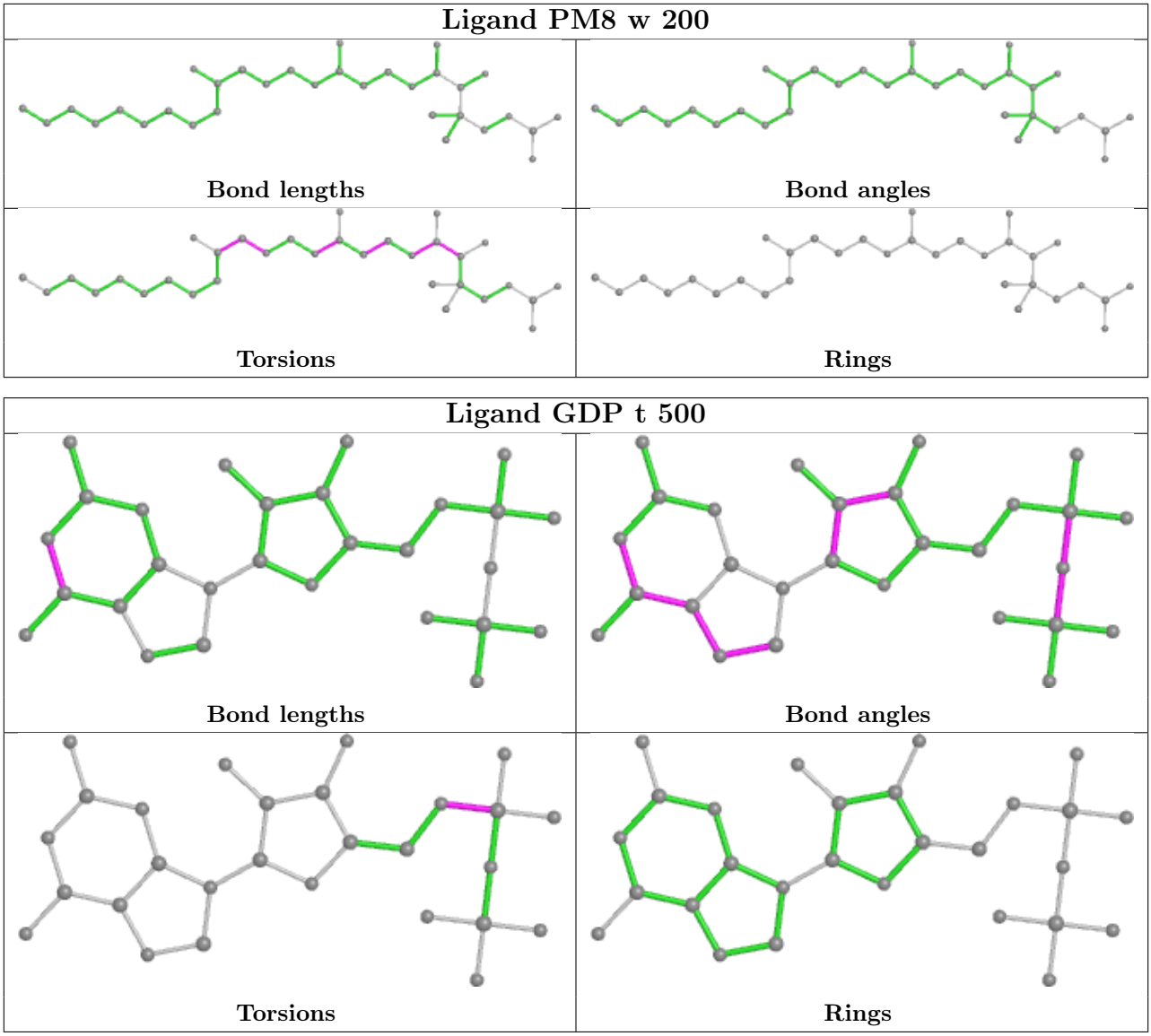
Bond angles



Torsions



Rings



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

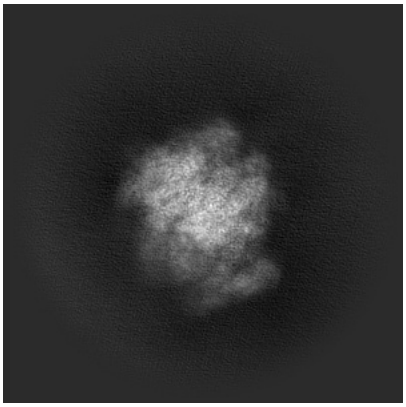
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-12847. These allow visual inspection of the internal detail of the map and identification of artifacts.

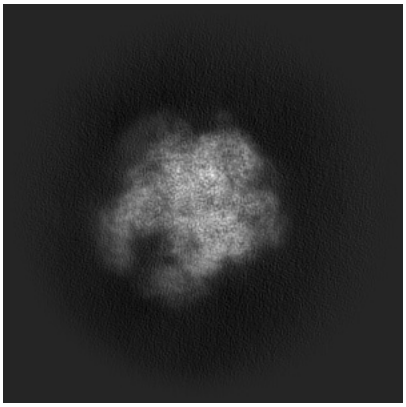
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

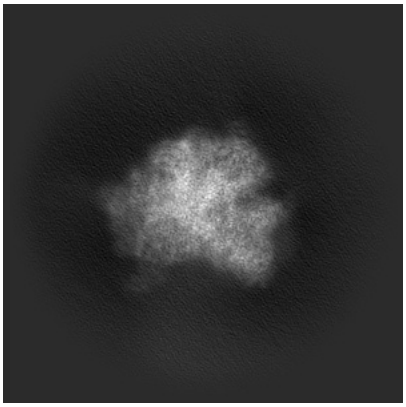
6.1.1 Primary map



X



Y

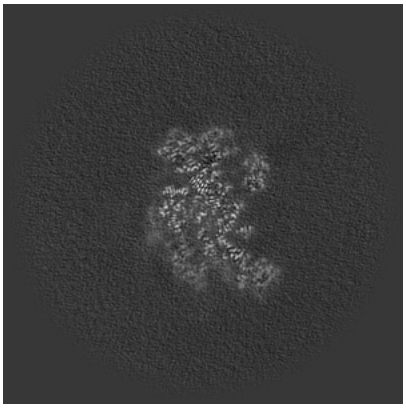


Z

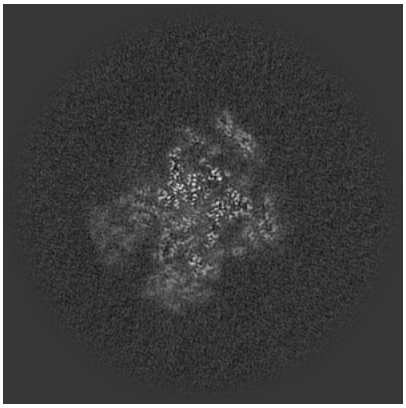
The images above show the map projected in three orthogonal directions.

6.2 Central slices

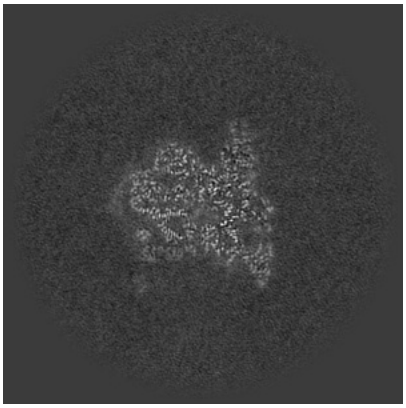
6.2.1 Primary map



X Index: 224



Y Index: 224

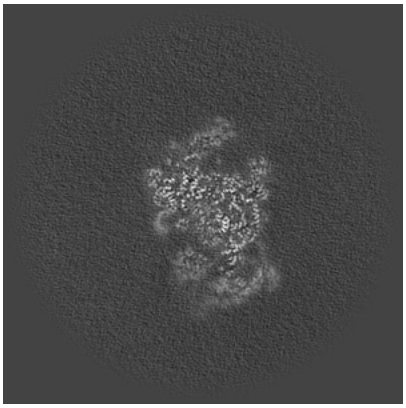


Z Index: 224

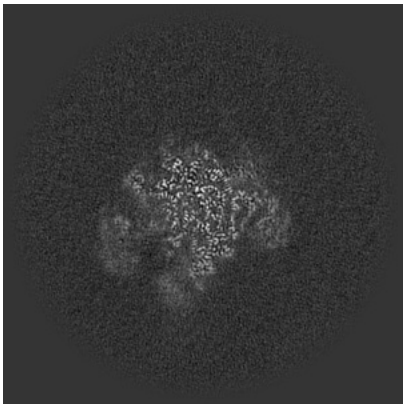
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

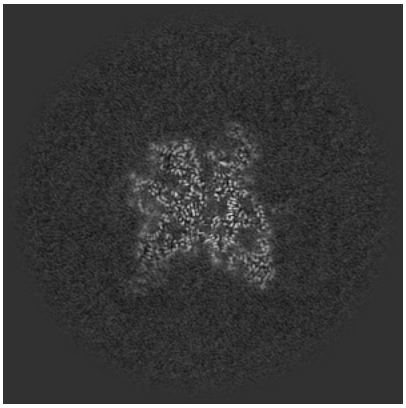
6.3.1 Primary map



X Index: 206



Y Index: 241

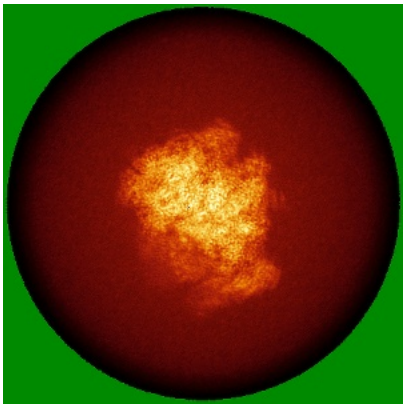


Z Index: 234

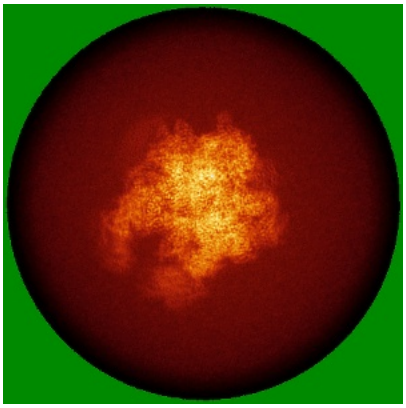
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

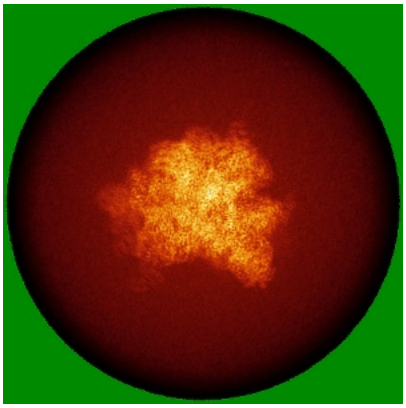
6.4.1 Primary map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X

Y

Z

The images above show the 3D surface view of the map at the recommended contour level 0.45. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

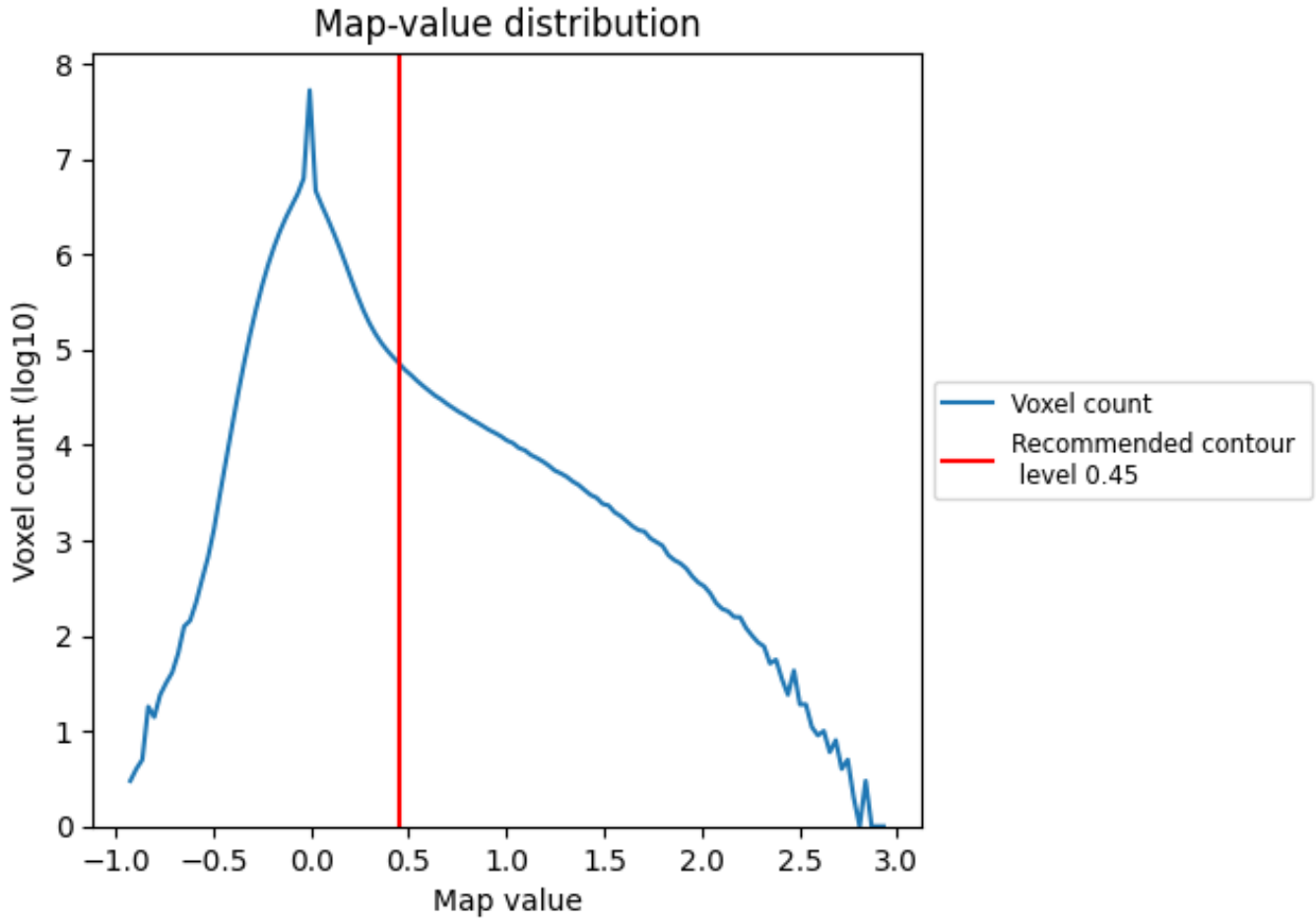
6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis

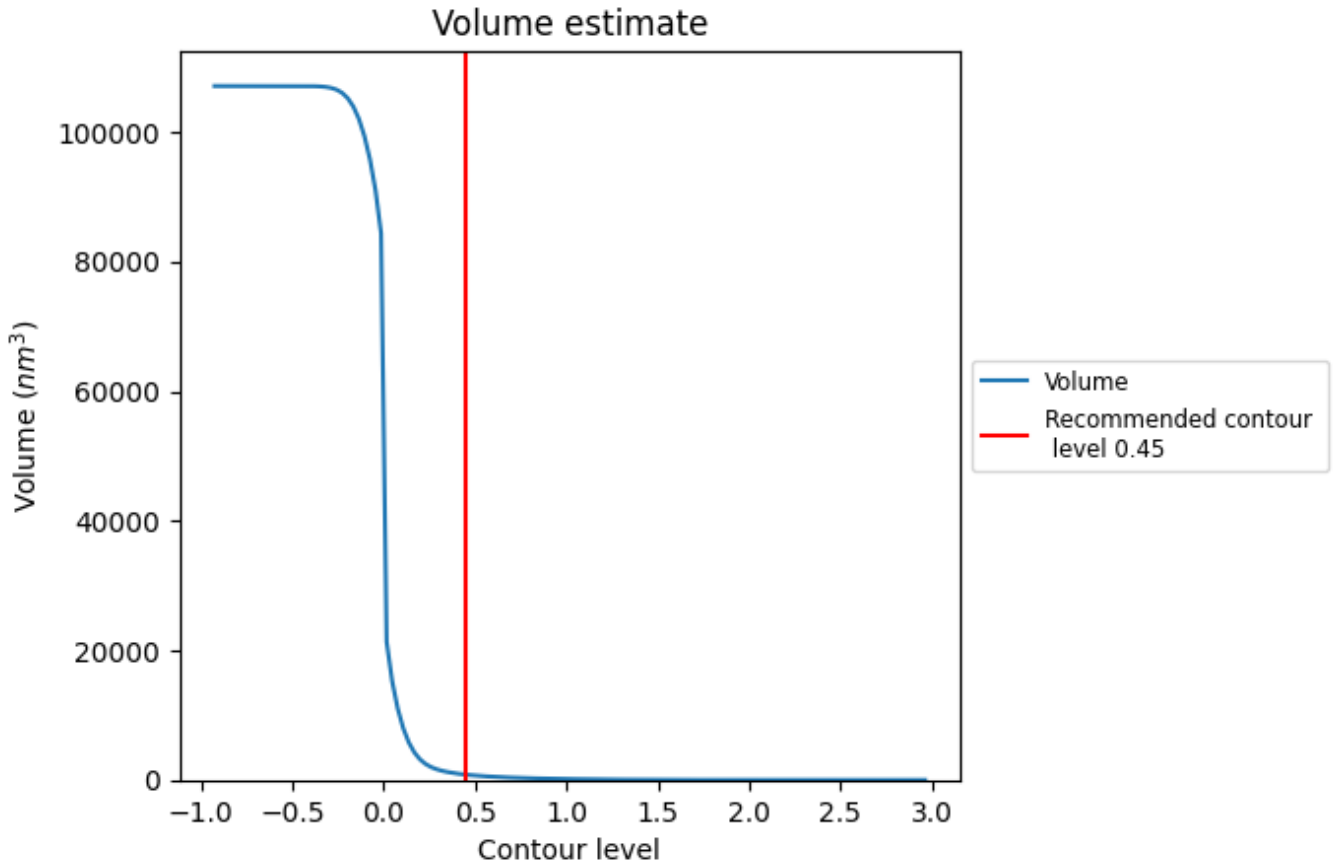
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

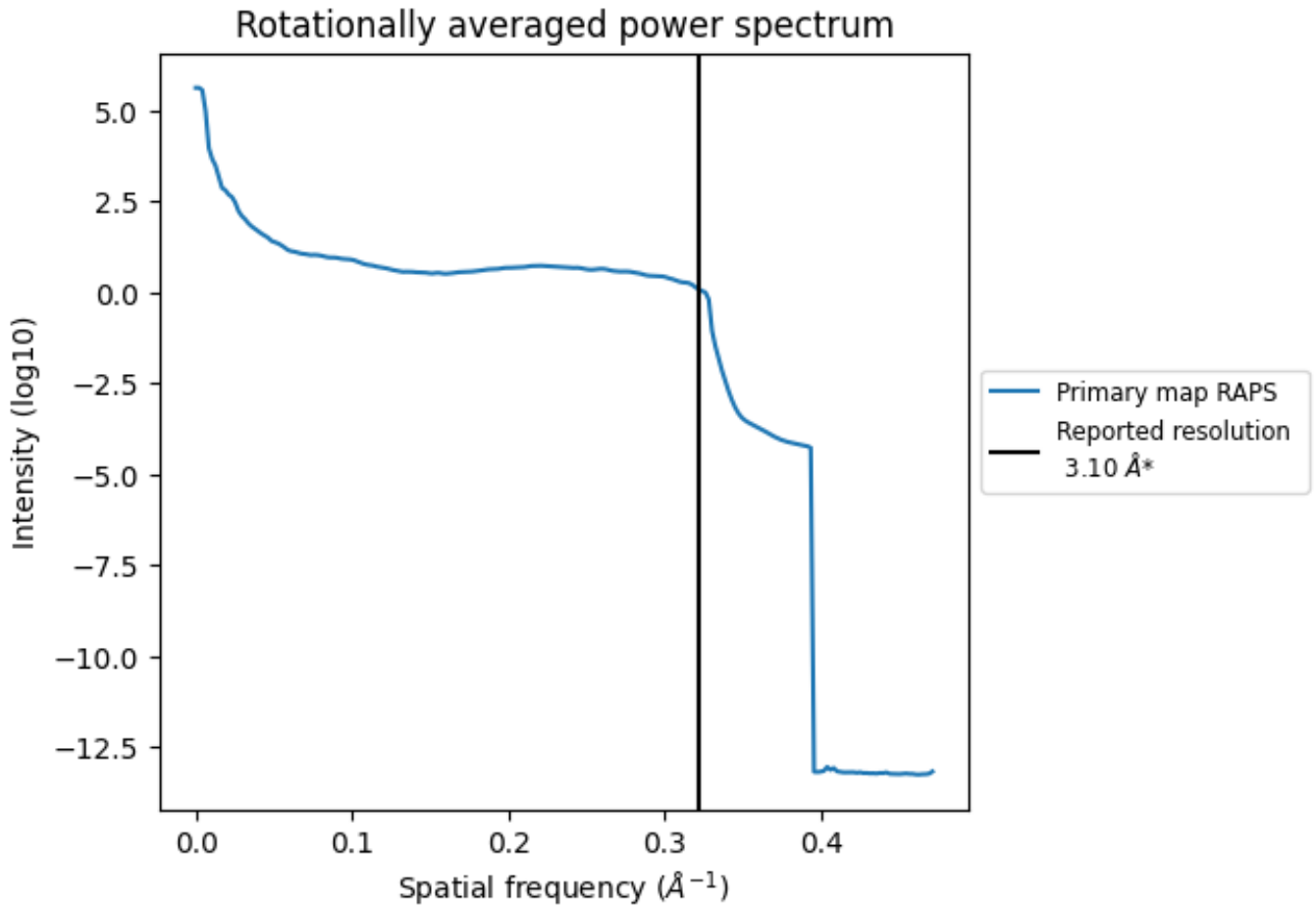
7.2 Volume estimate (i)



The volume at the recommended contour level is 820 nm^3; this corresponds to an approximate mass of 740 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum (i)



*Reported resolution corresponds to spatial frequency of 0.323 $Å^{-1}$

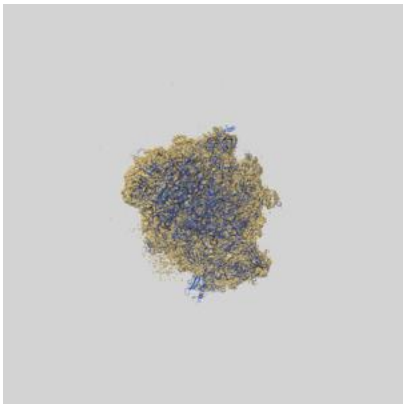
8 Fourier-Shell correlation (i)

This section was not generated. No FSC curve or half-maps provided.

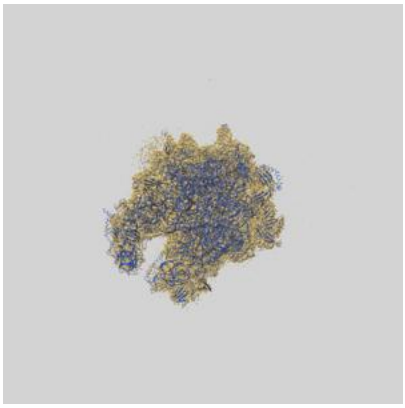
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-12847 and PDB model 7ODT. Per-residue inclusion information can be found in section 3 on page 17.

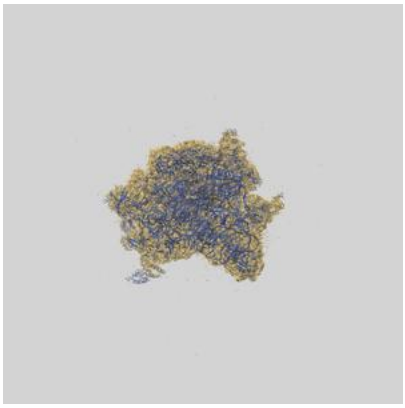
9.1 Map-model overlay



X



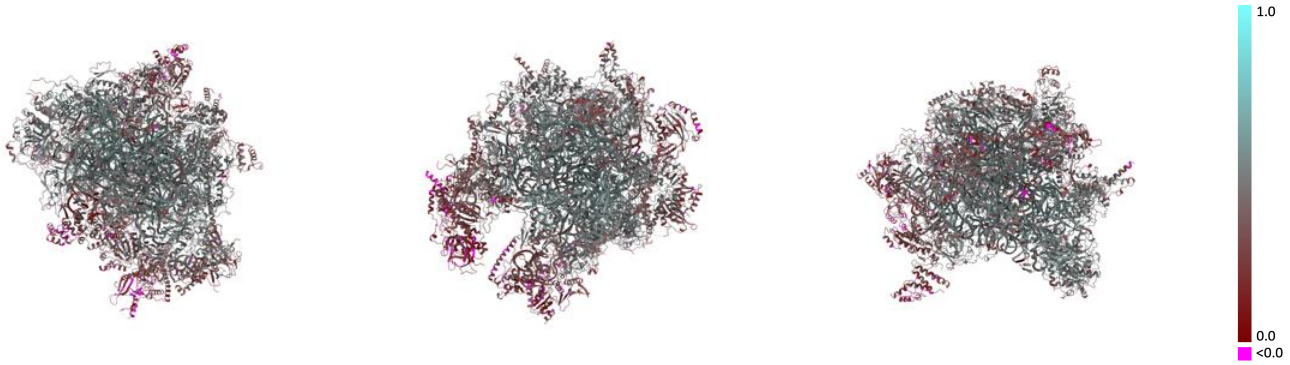
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.45 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

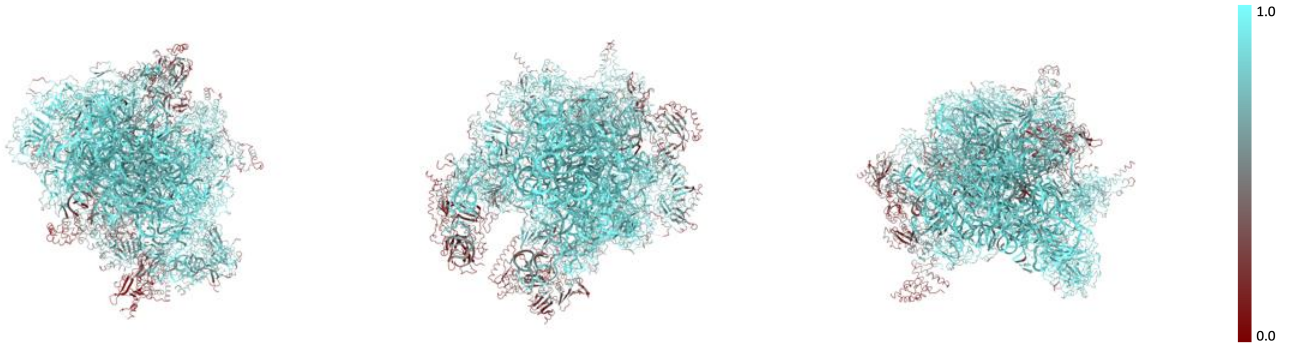
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

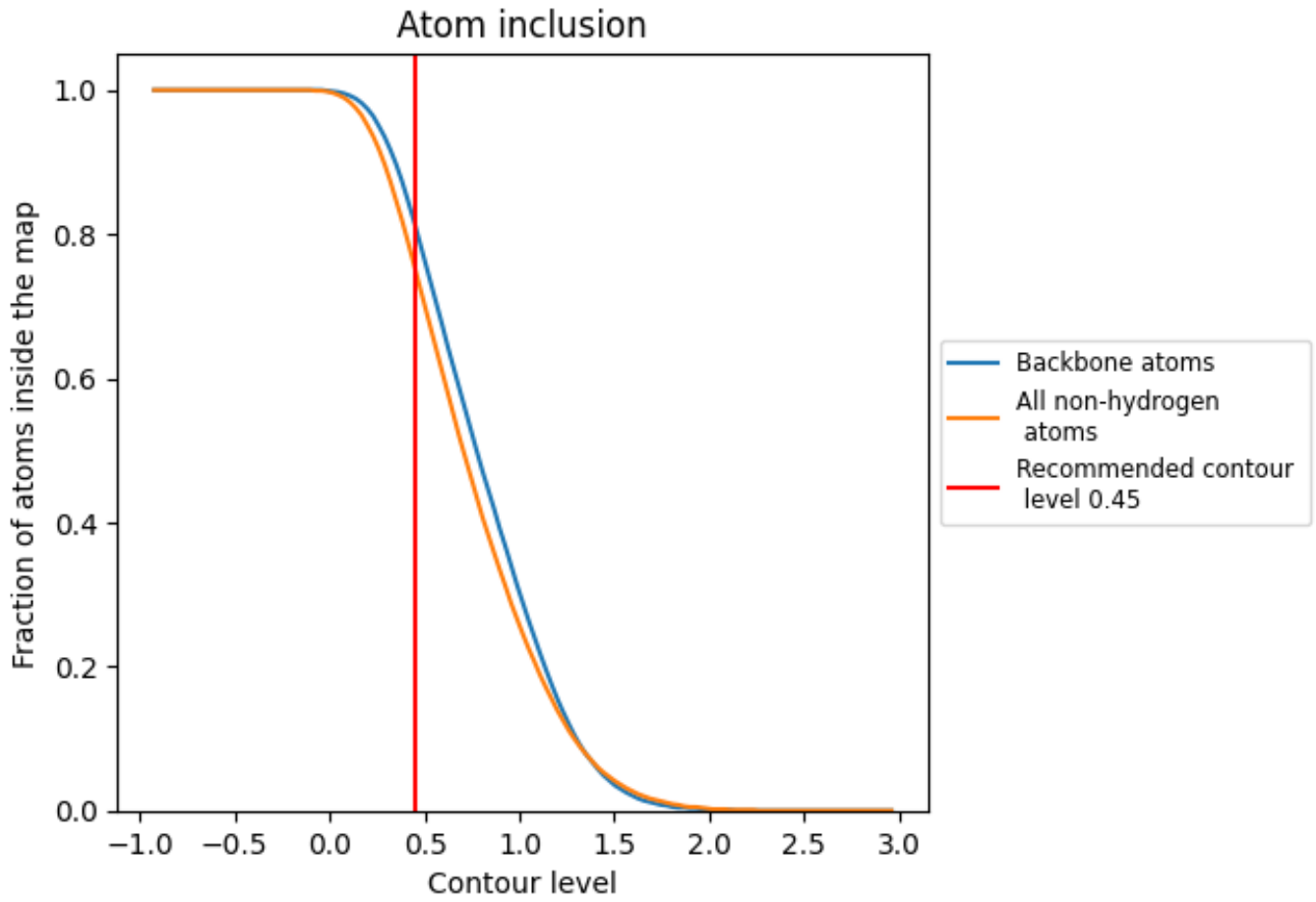
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.45).

9.4 Atom inclusion (i)



At the recommended contour level, 81% of all backbone atoms, 75% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.45) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7520	0.4300
0	0.7910	0.4660
1	0.7330	0.4480
2	0.9390	0.5690
3	0.9310	0.5550
4	0.8900	0.4830
5	0.8360	0.4690
6	0.7470	0.3900
7	0.6580	0.3460
8	0.2210	0.2000
9	0.7930	0.4550
A	0.9260	0.5010
B	0.7310	0.2760
D	0.7930	0.4700
E	0.8500	0.4740
F	0.8340	0.4820
H	0.6730	0.4070
I	0.4180	0.2610
J	0.1440	0.1740
K	0.8990	0.5050
L	0.7990	0.4520
M	0.8380	0.4880
N	0.7090	0.4340
O	0.8550	0.4850
P	0.8240	0.4480
Q	0.8190	0.4530
R	0.8990	0.5190
S	0.8660	0.4970
T	0.8380	0.4940
U	0.7390	0.4460
V	0.5050	0.3510
W	0.8760	0.5270
X	0.7790	0.4700
Y	0.8240	0.4740
Z	0.8630	0.5160

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Chain	Atom inclusion	Q-score
a	0.7390	0.4340
b	0.8550	0.4820
c	0.7630	0.4230
d	0.3600	0.2940
e	0.1350	0.1570
f	0.3010	0.2490
g	0.8350	0.4620
h	0.5110	0.3310
i	0.9020	0.5230
j	0.8070	0.4420
k	0.3980	0.2640
l	0.2440	0.2240
m	0.0700	0.1180
o	0.8550	0.5000
p	0.5840	0.3660
q	0.6740	0.3770
r	0.7920	0.4460
s	0.8490	0.4960
t	0.4460	0.2800
u	0.6260	0.3700
v	0.2410	0.2620
w	0.0420	0.1530
x	0.6580	0.3550
y	0.4390	0.2830